THE ROLE OF PHILOSOPHY AND THE PHILOSOPHICAL IN INFORMATION SCIENCE

by

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SUMMARY

The importance of philosophy and the philosophical is not on the lips of many library and information science practitioners and scholars, even though pervasive in information science theory and practice.

This investigation focusses on the relationship between information science, philosophy and the philosophical thinking attitude revealed through theoretical and practical concerns. This includes theory generation arising from the philosophical in exploring the role of philosophy and the philosophical.

It takes into account perceived problems in recognising, accepting and rejecting the role of philosophical approaches and the impact in determining the nature and the theoretical and practical aspects of information science.

The problem posed by not recognising philosophical approaches, is that the benefits of philosophical thought cannot be drawn on to understand how knowledge, information and its communication manifest through language and language expression.

Three pathways are used in order to reveal philosophy and the philosophical in information science, the connection between information retrieval and language, and philosophical thinking attitudes at theoretical and practical levels.

The value of the study lies in contributing towards knowledge and awareness of the effect of philosophical theories on problems seen as central research areas in information science and its domains.

The methodological approach gives preference to the comparative and pluralistic epistemology of a journey.

The study examines Peter Ingwersen’s cognitive perspective and information retrieval interaction, David Blair’s treatment of information retrieval with natural language as primary concern, and Fanie de Beer’s contribution on the inventive act of reading and knowledge organisation, as representative figures.

It is argued that information science cannot avoid philosophy in its different manifestations.

By understanding how philosophy manifests in information science, such as the role of philosophy revealed through language and information retrieval, an opportunity is offered to reconsider the discipline's interdisciplinary nature in the existing scholarly and societal environment, and the contribution of its historical development to the assumptions and philosophies underlying the discipline.

A further empirical study on how philosophy and the philosophical are embedded in information science research is recommended. It could investigate the influence of philosophy on decisions made by South African universities to redesign information science research and study programmes.

Keywords:
Information science; Information; Knowledge; The philosophical; Information retrieval; Philosophy of language; Theory development; Calculative and meditative thinking; Comprehensive thinking; Philosophy; Philosophy of information; Multiple, collective intellection; Multidisciplinary; The Northwest Passage

OPSOMMING

Biblioteek- en inligtingkundige praktisyns praat nie dikwels oor die belangrikheid van filosofie en die filosofiese nie, hoewel dit algemeen in die teorie en praktyk van inligtingkunde voorkom.

Hierdie ondersoek fokus op die verband tussen inligtingkunde, filosofie en die filosofiese denkhouding wat deur teoretiese en praktiese aspekte blootgelê word. Dit sluit die skepping in van teorieë wat uit die filosofiese voortspruit met die ondersoek na die rol van filosofie en die filosofiese.

Dit neem kennis van vermeende probleme met herkenning, aanvaarding en verwerping van die rol van filosofiese benaderings en die impak op bepaling van die aard en die teoretiese en praktiese aspekte van inligtingkunde.

Die probleem wat veroorsaak word deur nie die filosofiese benaderings te erken nie, is dat die voordele van filosofiese denke nie gebruik kan word om te verstaan hoe kennis, inligting en die kommunikasie daarvan in taal- en taaluitdrukking manifesteer nie.

Drie weë word gevolg om die filosofie en die filosofiese in inligtingkunde, die verband tussen inligtingontsluiting en taal, en filosofiese denkhouding op teoretiese en praktiese vlak aan te toon.

Die waarde van die studie lê daarin dat dit bydra tot kennis en bewustheid van die uitwerking van filosofiese teorieë op probleme wat as sentrale navorsingsgebiede in inligtingkunde en sy domeine beskou word.

Die metodologiese benadering gee voorkeur aan die vergelykende en pluralistiese epistemologie van 'n reis.

Die studie ondersoek Peter Ingwersen se kognitiewe perspektief en interaksie met inligtingontsluiting, David Blair se hantering van inligtingontsluiting met natuurlike taal as primêre belang, en Fanie de Beer se bydrae oor die vindingryke handeling van lees- en kennisorganisasie, as verteenwoordigende figure.

Daar word aangevoer dat inligtingkunde nie filosofie in sy verskillende manifestasies kan vermy nie.

Deur te verstaan hoe filosofie in inligtingkunde manifesteer, soos die rol van filosofie wat deur taal- en inligtingontsluiting openbaar word, word die geleentheid gebied om die

dissipline se interdissiplinêre aard in die bestaande wetenskaplike en samelewingsomgewing en die bydrae van die historiese ontwikkeling daarvan tot die aannames en filosofieë onderliggend aan die dissipline te heroorweeg.

'n Verdere empiriese studie oor hoe filosofie en die filosofiese in inligtingkundige navorsing vervat is, word aanbeveel. Dit kan die invloed van filosofie op besluite wat Suid-Afrikaanse universiteite neem om navorsings- en studieprogramme vir inligtingkunde te herontwerp, ondersoek.

Sleutelwoorde:
Inligtingkunde; Inligting; Kennis; Die filosofiese; Inligtingherwinning; Taalfilosofie; Teorie-ontwikkeling; Berekenende en meditatiewe denke; Omvattende denke; Filosofie; Filosofie van inligting; Veelvuldige, kollektiewe intelligensie; Multidissiplinêr; Die Noordwesdeurgang

KAKARETŠO

Bohlokwa bja filosofi le bja tirišo ya filosofi bo bolelwa kudu ke bašomi ba bantši ba dithutamahlale tša bokgobapuku le tshedimošo le dirutegi, le ge e le gore di tletše kudu ka go teori le tirišo ya dithutamahlale tša tshedimošo.

Dinyakišišo tše di nepišitše go kamano magareng ga dithutamahlale tša tshedimošo, filosofi le maikutlo a go nagana ka filosofi ao a utollotšwego ka dipelaelo mabapi le teori le tirišo. Se se akaretša moloko wo o dirišago teori e lego seo se bakilwego ke tirišo ya filosofi go utolla mošomo wa filosofi le wa tirišo ya filosofi.

Di hlokometše kudu mathata ao a bonwago ka go lekodišiša, go amogela le go gana mošomo wa mekgwa ya filosofi le seabe sa go tseba mokgwa le dilo tša teori le tša tirišo ya dithutamahlale tša tshedimošo.

Bothata bjo bo laeditšwego bja go se lemoge mekgwa ya filosofi, ke gore mehola ya kgopolo ya filosofi e ka se dirišwe gore re kwešiše ka fao tsebo, tshedimošo le poledišano ka ga yona di ka phethagatšwago ka polelo le tlhagišo ya polelo.

Ditsela tše tharo di a dirišwa ka nepo ya go utolla filosofi le tirišo ya filosofi ka go dithutamahlale tša tshedimošo, kamano magareng ga go hwetša tshedimošo le polelo, le mekgwa ya go nagana ka filosofi maemong a teori le a tirišo.

Boleng bja dinyakišišo tše ke go ba le seabe go tsebo le go temošo ka ga seabe sa diteori tša filosofi go mathata ao a bonwego bjalo ka dinyakišišo tše bohlokwa ka go dithutamahlale tša tshedimošo le go makala a tšona.

Tsela ye ya go diriša mekgwa e rata kudu mokgwa wa papetšo le wa go tseba dilo ka tsela ye e fapafapanego mo leetong.

Dinyakišišo tše di lekodišiša mokgwa wa kwešišo le kamano ya go hwetša tshedimošo tša Peter Ingwersen, kwešišo ya David Blair ya go hwetša tshedimošo le polelo ya tlhago bjalo ka selo seo se tlišago tlhobaelo ya mathomo, le seabe sa Fanie de Beer ka ga tiro ya boitlhamelo ya go bala le go beakanya tsebo, bjalo ka dilo tšeo di tlišago kemelo.

Go bolelwa gore dithutamahlale tša tshedimošo di ka se kgone go efoga filosofi ka tirišong ya tšona ye e fapafapanego.

Ka go kwešiša ka fao filosofi e dirišwago ka gona ka go dithutamahlale tša tshedimošo, go swana le ge mošomo wa filosofi o utollotšwe ka polelo le ka go utolla tshedimošo, sebaka se a fiwa go lebeledišiša leswa seemo sa thuto ye sa kamano le dithuto tše dingwe ka seemong sa bjale sa dirutegi le ka setšhabeng, le seabe sa tlhabollo ya yona mo nakong ye e fetilego go ditšhišinyo le go difilosofi tšeo di thekgago thuto ye.

Dinyakišišo tše dingwe tšeo di theilwego go boitemogelo ka ga ka fao filosofi le tirišo ya filosofi di tsentšwego ka go dithutamahlale tša tshedimošo di a šišinywa. Di ka nyakišiša khuetšo ya filosofi go diphetho tšeo di dirilwego ke diyunibesithi tša Afrika Borwa go hlama leswa dinyakišišo tša dithutamahlale tša tshedimošo le go mananeo a dithuto.

Manutšu a bohlokwa:
Dithutamahlale tša tshedimošo; Tshedimošo; Tsebo; Tirišo ya filosofi; go hwetša tshedimošo; Filosofi ya polelo; Tlhabollo ya teori; Go nagana ka go tsinkela le ka go gopodišiša; Go nagana ka kwešišo; Filosofi; Filosofi ya tshedimošo; Tše ntši, Bohlale bja bohle; Ya dithuto tše ntši; *The Northwest Passage*

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My son, Bryan	:	Always the wit and bringer of coffee
My parents, Marlene and Sybrand	:	Unwavering in their love and support
Adri, Karla, Maritha, Nicoline, Pierrene	:	My quirky friends, in alphabetical order
My guiding light, Fanie de Beer	:	A true troubadour of knowledge
My patient promoter, Mpho Ngoepe	:	A calm and collected presence
Gerhard van der Linde	:	The guiding voice from practice
A special thank you to Ilze de Beer	:	The editor with a heart of gold

You who look at everything through your perpetually open eyes,
is your lucidity never bathed in tears? (Serres 2008:46).

Mensediere is nooit tevrede.
Húlle beredeneer, bevraagteken
die mooie in die lewe;
net om agterna
leeg terug te sit.
(Burger 1980)[1]

[1] Marlene Burger: Poem VII in section “Gedagtes vir môre uit vandag: 1980” (Author’s private collection).

DEDICATION

Bryan, forever and a day

DECLARATION

Name: Karin McGuirk

Student number: [redacted]

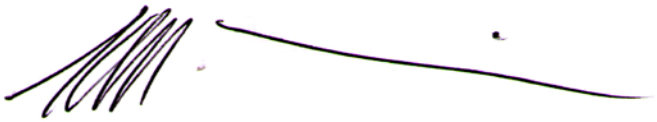
Degree: PHD (Info Science)

Title: The role of philosophy and the philosophical in information science

I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.



16 November 2019

SIGNATURE DATE

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CHAPTER ONE

INTRODUCTION

The tagliatelle arrived. There is something about it that interests me. Strands coming together and running in different directions. Something about the random nature of it. You can pick up any one end and just have no idea where the other end is, no idea which one will move (Robertson 2010).

1.1 Introduction and orientation

A lifelong fascination with the rhizome-type connections between the sciences (so-called hard and soft), and the stochastic-fractal dimension of culture, eventually led to the question "Why philosophy, or, is philosophy and particularly philosophical thinking important to information science?" Perhaps the right question all along was to ask, "What can philosophy do for us."[2] The question configures pathways to open questions, such as "What do we want from x or y?" and "Why did so and so choose x?"

The *philosophical* "speaks" through action, specifically that of reading, writing and thinking about texts. One can have that Lecercle's *language speaks* of Gadamer's *infinitude of the unsaid* and the *whole of what is there*. The "word," whether spoken, thought or written, is also about the "world" (De Beer 2016a:24). The *philosophical* does not attempt to separate language from the world, because to separate language from the world and life results in inadequate thinking and language remains a mere instrument (De Beer 2016a). Such inadequate or mutilating thinking is a kind of thinking attitude that treats meditative and calculative thinking (Weizenbaum 1984; Wersig 1990) as mutually exclusive, as opposites that cannot and should not ever interact, cross paths, cross-pollinate or mix. The philosophical thinking attitude is the reader as 'an explorer of lettered space' (De Beer 2016a:27),

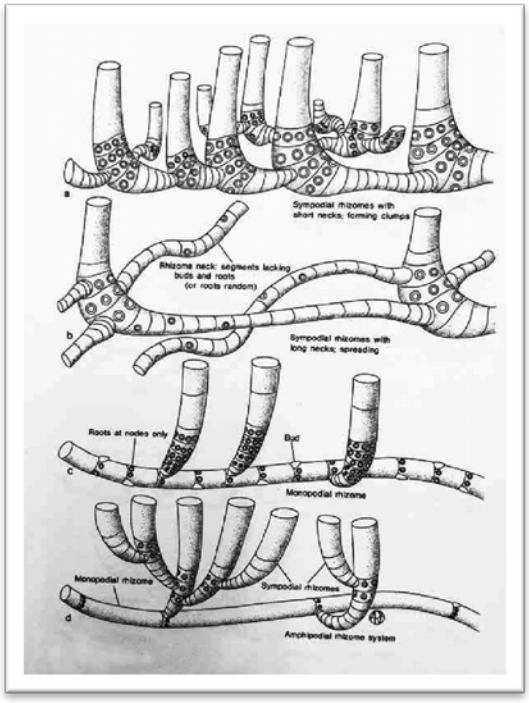
[2] Credit goes to Jonathan Furner for making this suggestion during the Copenhagen 2017 workshop on Social Epistemology.

a troubadour of knowledge traversing the archipelago of knowledges and possibilities and letting the new knowledge come (De Beer 2009a). Meaning-making and sense-making are part of a nomadic adventure and require a comprehensive thinking style. The Hermetic character *explores* “Being,” *invents* meaning and *creates* understanding through language, ultimately shaping true scholarship (De Beer 2016a:26). Alternative ways in which concepts and their meanings might be approached are using nodules and axes in a non-linear and non-hierarchical manner, for example according to the point-grid, a rhizomatic labyrinth, atlases of knowledge, passages, maps or trees.

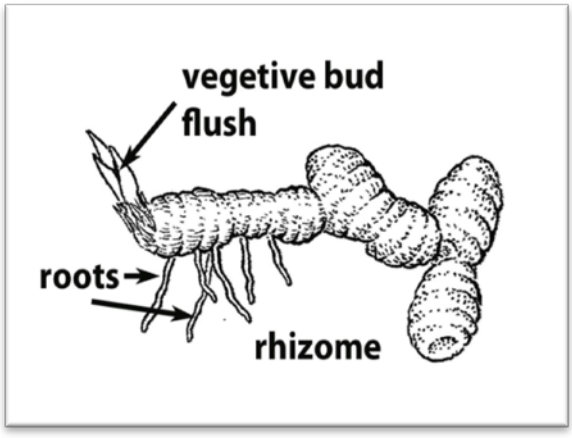
> The wisdom of the plants: even when they have roots, there is always an outside where they form a rhizome with something else - with the wind, an animal, human beings… Follow the plants: you start by delimiting a first line consisting of circles of convergence around successive singularities; then you see whether inside that line new circles of convergence establish themselves, with new points located outside the limits and in other directions (Deleuze & Guattari 1987:11).

Image 1 shows botanical illustrations of rhizomes.

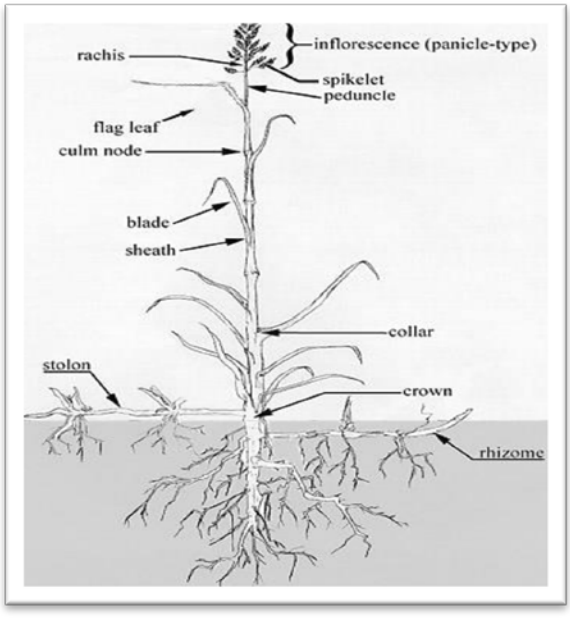
Iris Florentina, Iris Calcedonica latifolia and *Iris Illyrica* (image from Gasser 2017)



Rhizome root (image from Garoian 2012:289)



A rhizome or horizontally oriented, underground stem, drawing by B Angell (image from *Glossary for vascular plants* 2019)



Rhizomes and stolons (image from *Rhizomes and stolons* 2019)

Image 1 Botanical illustrations of rhizomes

The rhizome as a metaphor for a thinking attitude that is rich, chaotic and inventive represents infinite possible communicative connections that resist stagnation. Stagnation is death to the multiple. The rhizome root system enables communication between different plant species. The underground “channels” of root systems and spores, such as those between fungi and forest trees impart “information” about nutrients, danger, changes, adaptations, among others. These life forms never merge or become one physical organism, but they do form an invisibly interwoven and open system of symbiotic sharing and exchanging, never parasitic. In a similar manner, calculative and meditative thinking can be observed, even measured in physical terms. The rest, however, are often based on inference or reading[3] (De Beer 2016a:137). These questions lead us to rethink how we define science and ask questions about what kind of science is information science. Alternative ways to linear, circular or cyclic approaches, that use nodules and axes in a non-linear, non-hierarchical and non-static or dynamic manner include the point-grid of Tschumi (1998); the labyrinth of Eco (2012, 2014); the rhizome type method and principle of multiplicity (Deleuze & Guattari 1987); Serres (1982) on thinking the multiple and the Hermes character; and Descartes’ ‘all Philosophy is like a tree’ (Descartes 1903:119).

The ancient natural philosopher may have been closer to the *philosophical* than we can hope to be with all the information and modern technological equipment at our disposal. We seem to have willingly let go of our natural heritage without much thought, as if truly separable from our cultural, spiritual and artful selves. Natural philosophers, such as Aristotle and Plato, used taxonomy and principles of classification to describe animals and plants and grouping them. This included the effect of different environments on the physiology of a plant - its roots, stem, leaves, pollination (e.g. tree or shrub), seen in Theophrastus’ two volumes, *Historia plantarum* and *De causis plantarum*. Initially, building botanical records was aimed at providing reliable information to pharmacists. The consequences of modern science and its focus on the benefits for humans at the cost of science for the sake of

[3] The use of the concept of “reading” here includes its meaning as interpretation, understanding, analysis, impression, sense, evaluation.

knowledge (Pavord 2005:26), appear to be regression rather than “progression”. Theophrastus (370 BC – 290 BC) ‘was the first person to discuss plants in relationship to each other, not just in terms of their usefulness to man. … [He] wanted to know them in a different way, just for the sake of knowing’ (Pavord 2005:21). Theophrastus was a ‘gatherer together of knowledge’ (Pavord 2005:24) in the quest for order, and his explorations into plants were strengthened by philosophy:

> Theophrastus wasn’t writing an encyclopaedia of plants, ranged alphabetically from almond to vine. He was asking questions about plants. How do you define a plant? Which parts are most useful in choosing a way to classify them? (Pavord 2005:25).

Presented here is the background to the choice of philosophy for the purpose of the three-pathway investigation into the role of the philosophical in information science. The explanation of what this study means by philosophy and *the philosophical*, is done according to the following concerns in relation to philosophy within and from without information science as a discipline.

The first concern is philosophy as an explicit presence in the traditions within the library and information science context. For example, Bradley and Sutton (1993), Frohmann (2004a, 2008) and Budd (2004), illustrate how philosophy manifests within library and information science, as well as *the philosophical* as implicit and explicit thinking. In the second place, Ingwersen (2001), by linking *philosophical systems with the library and information science (LIS) approach*, is an example of an information scientist working philosophically within the context of information retrieval. Schools of thought, for example Margaret Egan and Jesse Shera’s social epistemology (Egan & Shera 1952), can be used to detect the philosophical, thus identifying a specific way of thinking. Third, the *philosophical and empirical nature of assumptions* may influence, for example how decision making in library practice determines how a library works or functions.

If information science, therefore, cannot escape or avoid philosophy in its different manifestations, then the question changes to how to deal with it in a responsible

manner by perhaps asking what philosophy can do, and means, for information science. The five principles represented by Michel Serres' (1982) Hermes, god of paths and crossroads, messengers and merchants, offer ways to understand/reflect on the enquiry, namely communication, interference, traduction/translation, distribution, and the Northwest Passage. *Communication* seen as voyage, translation and exchange under the sign of Hermes, *Interference* is the means by which messages interfere with and refer to each other (inter-reference), thus a new scientific spirit defined as a philosophy of transport, involving intersection, intervention and interception. *Traduction*[4] (translation) translates/converts messages and evaluates their transformations; reflects the impact of science and technology in the aesthetic domain. *Distribution* is about the intermingling of communication theory, thermodynamics and topology, relations among the sciences. It marks the end of the stable systems of classical science, the message becoming chaotic and scattered. *La Distribution* is another name for disorder: water, steam, fuel constitute fluctuating groups. *The Northwest Passage* outlines the passages among these fluctuating groups, between the universality of form and the individuality of circumstances. The method of passage is that of the journey, a journey Hermes calls an excursion or expedition filled with random discoveries that take advantage of the varieties of spaces and times:

> His route is not the shortest distance between two points: it is a world in itself, made of serpentine paths where chance and the unforeseen may happen (Faivre 1995:13-14).

The Northwest Passage (Figure 1) is a complicated maze full of dead ends and blocked paths that describes the bridge from the humanities to the exact sciences. This possible, and vital, *communication* between the two domains (spheres of knowledge) is always difficult and unique, necessitating this kind of passage to make connections and relations.

[4] Traduction: to guide over/into; converting something (e.g. energy or a message) from one form into another; transferring a signal across or through something (e.g. sound waves into electric waves); transporting, transforming or converting something from one form, place, or concept to another (e.g. physical signals into encoded neural signals).

Figure 1 The Northwest Passage (image from *Encyclopædia Britannica* 2016)

This requires the contemporary rejection of the 'old alliance between the culture of science and the humanities – a vital synthesis' (Serres 2003:57) to be counteracted. A *tabular* instead of a linear approach is considered as a shift or transference away from merely retrieving *what is already there*, the familiar or known meaning, and static, easy combinations and contexts, towards synthesis and not mere system-forming. Because knowledge is dynamic, it is necessary to question whether the information science terminology, for example "organisation" and "retrieval," has become archaic in meaning, application and/or context. It does not make the terminology obsolete, but rather that the terminology has become central in a different way, such as within societal, economic and political environments where innovation is the source of the production process that considers knowledge and information as its materials.

Table 1 represents a timeline of the four revolutions that reshaped human reality and self-understanding in the process of displacing and reassessing the fundamental nature and role of humans in the universe (Floridi 2014:90). The timeline does not imply a linear progression of the four revolutions as stages. It is understood as overlapping phases and not mutually exclusive stages with definite beginnings and

ends. The seeds of change, and even regression, are often sown long before any visible culminations, shifts and revolutions. What may seem at first to be abrupt or radical may have taken years to unfold (Schwab 2016:11), and continue to do so. The passage or journey of the revolutions and their precursors corresponds more to that of the Northwest Passage (Figure 1).

Table 1 The four revolutions of our self-understanding (based on Floridi 2014:87-93)

COPERNICAN REVOLUTION	DARWINIAN REVOLUTION	FREUDIAN / NEUROSCIENTIFIC REVOLUTION	INFORMATION / FOURTH REVOLUTION
•**1543** "On the revolution of celestial bodies" – Nicolaus Copernicus (1473-1543). •In the heliocentric cosmology the Earth, and thus humans, are not at the centre of the universe or fixed.	•**1859** "On the origins of species by means of natural selection" – Charles Darwin (1809-1882). •Humans are not separate or different from the rest of the animal kingdom.	•**1917** "A difficulty in the path of psycho-analysis" – Sigmund Freud (1856-1939). •The mind is not fully transparent to ourselves; our consciousness is opaque to us.	•**1950** "Computing machines and intelligence" – Alan Turing (1912-1954). •Position of humans as masters of the infosphere is displaced (logical reasoning, information processing, intelligent behaviour).

The four revolutions of dislocation and reassessment of self-identity as identified by Floridi (2014:87-90) are represented in Table 1. The first revolution is the *Copernican revolution* associated with the sixteenth century work of Nicolaus Copernicus on the movements of planets around the sun, forcing humans to reassess their immovable and central place in the universe (Floridi 2014:87-88). The second revolution is the *Darwinian revolution* in the nineteenth century with the work done by Charles Darwin on natural selection and evolution, revealing that humans are not 'unnaturally separate and diverse from the rest of the animal kingdom' (Floridi 2014:90). The third revolution is the Freudian or neuroscience revolution, which displaced humans 'from the centre of the realm of pure and transparent consciousness' (Floridi 2014:90) by revealing that humans are not Cartesian minds completely transparent to themselves, with Sigmund Freud's psychoanalysis work in the late nineteenth and early twentieth century. The fourth revolution is the *information revolution* (Floridi 2014:90) and is associated with Alan Turing. His twentieth century contributions

unseated humans from their privileged position by not only revealing the informational nature of human identity (logical reasoning, information processing, intelligent behaviour), but also that this nature is shared 'with some of the smartest of our own artefacts … *We are no longer the undisputed masters of the infosphere*' (emphasis added) (Floridi 2014:93).

1.2 The role of philosophy and philosophical thought

The role of philosophy within the subject field of information science is not about vague ideas or thoughts without structure. The relationship is investigated to reveal the various representations or forms of and approaches to concepts such as reason, logic, chaos, creativity and the physical / non-physical world or reality. The position taken in this study is that philosophical thought varies from the rigid and formal to the outright ephemeral, stochastic-fractal, open-ended abstract expressions and impressions. The importance of philosophy, particularly *philosophical* thought for information science is emphasised by the different perspectives found in the scholarly literature on how information and knowledge are understood and organised. These views impact research undertaken in information science and reflect different theoretical foundations. 'Research is rooted in philosophical beliefs about values, concepts, and the nature of knowledge' (Killam 2013:48).[5] Theoretical foundations bring with them their own historical and cultural backgrounds, assumptions, principles and concepts, associated fields, criticisms and potential problems. The study, therefore, is a pluralist undertaking committed to 'diversity and tolerance of different approaches' (Della Porta & Keating 2008:xiv).

The hypothesis is that philosophical assumptions and viewpoints influence perceptions of and approaches to information science interests, including information professionals and their knowledge, actions and understanding.

[5] The full quote is from Killam (2013:48): 'In order to appreciate these philosophical beliefs, several key concepts and terms require consideration and understanding.'

The use of the concepts *philosophy* and *the philosophical* or philosophical thought in this study is neither as synonyms nor as antonyms, but rather recognised in close relationship to each other. The “philosophy” referred to in this study does not refer to the discipline of Philosophy as such, unless indicated otherwise. The approach to philosophy in this sense is as a mode of *the philosophical* to denote the underlying explicit and implicit philosophies, sometimes referred to as frameworks or approaches in the information science literature. The *philosophical* is not used as the adjectival, or being an adjective. The philosophical is used here as a noun; it is about a particular *attitude*, position, standpoint, a process. The philosophical involves an ‘emotional involvement [and] an intellectual challenge to one’s thinking capacity that calls for constant commitment’ (De Beer 2009b:22). This calling is a thoughtful attitude and disposition, not a dogma or specific philosophical tradition, to be utilised by any scientist even without making it explicit (De Beer 2016a).

This means that even though *the philosophical* remains morphologically an adjective, syntactically it becomes a noun, which is form plus function, and is to be understood as being conceptual and theoretic, not empirical. Therefore, philosophical thought or thinking does not represent something unidentifiable. Its relationship to information science does not entail loose ideas and thoughts lacking in structure. The relationship takes a different shape, or approach, to matters such as reason, logic and the physical and non-physical world of our reality. Philosophical thought can vary from the very rigid and formal to the outright ephemeral and open-ended, abstract expressions and impressions. Of specific interest, therefore, is *the philosophical* or philosophical thought or attitude as a way of thinking, rather than the discipline of philosophy. The concept *the philosophical* may of course still be informed and influenced by intellectual or formal philosophies. The connections between philosophy and the philosophical in information science are examined by emphasising specific elements. These elements are language and information, linking information retrieval and knowledge organisation, and language encompassing meaning, thinking and reading. The question this raises is how information science can go about such influences in a responsible manner, if the assumption is that philosophical manifestations are an integral part of the discipline.

1.3 Research problem

The theme of the study is an investigation into the role of philosophy and the philosophical within the subject field of information science. The theme is not to prove connections between philosophy and information science, because such connections are assumed to exist already. The role and presence of philosophy and the philosophical in information science is taken as a given, and entails the assumed role of philosophy concerning information science. The central objective is to investigate the perceived problematic issue in recognising, accepting and rejecting the role played by philosophical approaches in information science, and the impact of this problem on determining the nature, theoretical and practical aspect of information science. The question of whether the actual or potential role of philosophy in information science is large enough, important enough, to represent such an acknowledgment or recognition, is also considered.

The study is not a history of philosophy and information science connections, although the history brings the vision of the study into focus. The importance of and need for theoretical work, especially given the stream of publications emerging in the field of information science on themes of *theory development*, *philosophy of information* and renewed interest in *social epistemology*, inspired this study. The time to explore these and related issues further was never better than currently, perhaps even long overdue.

Philosophy and philosophical thought in information science theory and practice can be traced through information science publications dedicated to philosophy themes. Certain publications, for example, have special issues dedicated to philosophical matters in the information science milieu. This is summarised in Appendix A (Information science publications with special editions on philosophical and epistemological themes) and Appendix B (Hjørland's list of LIS literature about theories, metatheories and paradigms). These works are by no means the only ones, but they represent and include many pioneers, thinkers and scholars on the matters that inspired the aim of this study.

Philosophy and *the philosophical* themes in information science are discussed according to the following considerations:

1) The relationship between philosophy and information science as revealed through the role, impact and elements of philosophical thought in information science, and the roots that are mostly *external* to the contemporary disciplinary boundaries of information science.
2) Language expression and its historical and contemporary place in the library setting link to the language philosophy approaches that affect information science, such as post-structuralism, structuralism, literature studies and cognitive science. Language is integral to information science – the success of information retrieval depends on language applications, interpretations and meaning-making processes. Language has different manifestations in different scientific approaches, including the impact of language on the success of practices employed in different fields.

These considerations connect to the role of philosophy in information science: without language, there can be no framework or methods (Radford & Budd 1997:320). Perhaps, by understanding how philosophy manifests in information science, the role of philosophy in information science can be revealed by means of language and information retrieval within a metaphorical library setting. Illuminating the relationship between philosophy, language and information retrieval may also promote an understanding of the role of language in forming theories in information science, and shaping what kind of science information science is or might be. This is shown through the work of Blair on information retrieval and language, and Ingwersen's information retrieval from a cognitive viewpoint. The main hypothesis is that, in constituting information science as a particular kind of science, its theories are connected to the philosophical foundations thereof within the setting of the *philosophical* through language.

The value of the study lies in contributing towards knowledge and awareness of the effects of philosophical theories on the problems perceived as central research areas within information science and its domains or sub-disciplines. For example, for

Hjørland (2003:805) the benefits of epistemological research is as integral to information science as the fact that empirical frameworks do not function without theoretical assumptions. He also stresses the importance of reflecting on philosophical foundations in order to determine their adequacy. It is through the means of philosophy in information science that an argument can be made for the necessity of epistemological argumentation in the subject field (Hjørland 2005a). Recognising the different ways of thinking about the relationships between humans and information, and thus the various ways in which information professionals and information seekers interact, is crucial to information science (Budd 2005). This necessitates a consideration of the relationship between not only philosophy and information science, but between philosophy and the natural and physical sciences. The study argues for the value and benefit of investigating philosophical attitudes in information science, and ultimately for furthering a multiple, inclusive and creative thinking attitude, situated within the milieu of a conception of information science as an *interscience*.

1.4 Aim and objectives

The main aim of the study is to investigate by finding answers to the objectives by way of an exploration of the literature, using the pathways as methodology. Such an investigation of the role of philosophy in information science is subject to a wide range of viewpoints and positions. The identified attitudes are explored as pathways into the role of philosophy in information science. These pathways cannot be performed meaningfully without recognition of philosophical influences and frameworks from outside the disciplinary boundaries of information science. Hence, this study takes into consideration the significance of non-information science thinkers of special interest to information science, in particular those concerning the nature of connections between philosophy, science and information. The objectives examine the contributions made by philosophy to information science and how it is, or can be, activated.

The importance of understanding and evaluating the role of philosophy and the philosophical in information science rests on three cornerstones, which form the *objectives* of the study:

1) Analyse three pathways to philosophy in information science and the relation of these pathways to information practice (chapter 3). This study accepts the existence of an explicit and implicit relationship between information science and philosophy as revealed through the philosophical.
   - The *first pathway* is attitudes in information science towards philosophy, philosophers and philosophical concepts. It is about recognising not only the existence and contributions of philosophy in information science, but also the need to explore and develop the philosophical frameworks that influence knowledge, understanding and practice.
   - The *second pathway* is information science scholars writing about philosophers and philosophical ideas relevant to this study.
   - The *third pathway* is the philosophical connections to information and the information science discipline. These scholars are not information scientists themselves, but they write and speak about matters that concern information science and/or about information science itself. Such scholars include Serres, Latour, Morin, Althusser, Deleuze and Guattari.
2) Reveal the role of philosophy and the philosophical through the work of David Blair, Peter Ingwersen and Fanie de Beer (chapter 4). The contribution of Blair on information retrieval (IR) and his focus on a specific philosopher, namely Wittgenstein and his later philosophy of language is considered. Ingwersen's use of a philosophical approach, the cognitive view as a framework of his information retrieval interaction, and particularly developing it into an integrated, holistic cognitive model for information seeking and retrieval (IS&R) is of interest. It also reflects the embedded role of language in the meaning and interpretation of information. Their work is approached as

connections to the contributions of Luciano Floridi's Philosophy of Information (PI) and De Beer's work on the inventive act of reading and information science as an interscience.

3) Contribute to a mapping of information science from the viewpoint of it in an inter- and post-scientific position (chapter 5). Michel Serres' writing on information and *multiple connective intellection* is used as the connection between what information science as a science entails and what "science" is; the relevance of existing definitions of science, including its object and methods; and what the original purpose of science, which is about knowing and knowledge, can signify for information science.

The areas in information science employed to illustrate the contributions of philosophy to information practice as a way of knowing, including thinking, reading and writing through *language*, are information organisation and retrieval. These areas may contribute to understanding the role of the human image, for example text image and assumptions about the human image, in an area such as information retrieval. The core concepts are information and knowledge, information retrieval, philosophy and *the philosophical*, language, thought, theory and epistemology. The meta-theories and philosophies within information science may expose the epistemological positions in the subject field, and therefore the methodological approaches.

1.5 Scope: delimiters and assumptions

The thesis is not an attempt at theoretical system building. It is, rather, an invitation to go on an exciting intellectual journey in order to 'delineate the world' (Berger 1971:8) again. The delimiters of this study are philosophy, the philosophical, language (philosophy of) and information retrieval, based on the intellectual content of information sources. The focus is on aspects relating to the meaning content of *the philosophical* as thinking attitude or standpoint.

For the purposes of this study, the discussion on information retrieval and knowledge organisation emphasises subject analysis and the process of classifying information. This enables access to the intellectual content of sources or bibliographic entities and is considered, together with the user, as a key criterion for arranging and presenting information, to illustrate the role of philosophy in the information science domain of information retrieval (IR). Irrespective of the classification system used in an information environment such as a library, classification systems ultimately exist to represent, utilise, mediate and organise *knowledge*. This includes origins external and internal to the disciplinary boundaries of information science. The assumption that the relationship between philosophy and information science is visible through the presence of philosophical thought and attitudes within information science connects to the hypothesis that philosophy plays a significant and exciting role in the intellectual world of information science.

We can then ask *what philosophy can do for us*, resting on the following three ideas formulated for this study:

1) The history of *a way of thinking* and theory in a discipline is revealed through its origins, developments and movements. The conception of information science as a *scientific* discipline is anchored in (a) its historical and contemporary foundations, thus the philosophical foundations and philosophical sophistication of its historical scholarship, such as the “isms” shaping the field, emerging theories and older or traditional patterns, and its pioneers or key players; (b) its methods as a science; and (c) its basic concepts.
2) This entails the *philosophical foundations of information science as a science*: the broader implications of how information science understands human nature, including *mind, self* and *society*, are revealed through the integration of its classic theories with the theoretical approaches of *other* information-focused scientific disciplines, also referred to as being information-scientific. This can build and shape the area or “continent” of a discipline and form connections between theoretical approaches by becoming knowledge for action.

3) Information science is approached based on the methodological problems, key problems of information theories and the informational enterprise revealed by (a) the classical thoughts and modern concerns of the discipline, its founders, philosophical interests and ethical problems; and (b) the role of information science as a scientific discipline in the contemporary world concerning its knowledge and calling.

1.5.1 Structure of the study: pathways and connections

The conceptual framework of the study is organised around three cornerstones. The first cornerstone is approached from the perspective of different *pathways* towards philosophy in information science in an effort to reveal the role of philosophy and the philosophical. The second cornerstone is the connection between *information retrieval and language*. The third cornerstone is the philosophical *thinking attitude* in information science as revealed at theoretical and practical levels.

The first cornerstone is the broad pathways concerning philosophy and the philosophical in information science. The examples used to illustrate the role of philosophy are from contributions from within and outside information science. The *Philosophy of Information* (PI)[6] of Luciano Floridi (2002a, 2002b, 2004a, 2004b, 2019) is an approach that explicitly employs philosophy as part of information science. The Philosophy of Information relates to the *role* of philosophy concerning relevance and interaction as part of information science research, and philosophy as a meta-scientific scientific research approach. Examples from outside information science, which include Bernard Tschumi's (1998) application of Jacques Derrida's deconstruction philosophy to his architecture, the use of Michel Foucault by Garrett (1991) in the library milieu, and the work of De Beer (1980-2017) employing Michel Serres' ideas on thinking and reading, do not imply a narrow definition of information science. The literature reveals philosophical thought and theories of science from a

[6] When the initial letters for "philosophy of information" appear in upper case, it designates the approach put forward by Floridi, that is, *Philosophy of Information* (PI). The "philosophy of information" in lower case initial letters refers to a broader meaning or general use by others.

variety of scientific perspectives that inform directions and movements in information science. The epistemological and methodological approaches are made visible to enable identification of approaches with the potential to enrich the theoretical and methodological foundations of information science (Hjørland 2005a:156).

1.5.2 The connection between information retrieval and language

The second cornerstone draws a connection between information retrieval and language. Languages, whether as artificial languages (notations, ontologies) or natural languages, have always had relevance in the information science environment. This includes an increase in the attention paid to translation, natural language processing, cross-language retrieval and the impact of language technologies (Bawden 2010). The philosophy of language, according to Blair (2005:1), gives insight into how we understand meaning, which is crucial to information retrieval and information systems as enabling search tools, using the later philosophy of language by Wittgenstein (1974). Understanding is important to information retrieval and the fact that philosophy of language is about how we mean what we say, that there are no strict boundaries between understanding, language and cognition, and that it is fundamentally about examining meaning, makes philosophy of information an integral part of investigating information retrieval (Blair 2005; Ingwersen 1992b). Language expressions, especially in the information practice setting, are inseparable from information retrieval. This can be seen in a question like “How does language, understanding and meaning impact on providing access to the intellectual content of information?” “Can information retrieval benefit from Wittgenstein’s approach to natural language in the context of the complexity and subtleties of language expressions?” (Blair 2005:1).

1.5.3 *The philosophical* as thinking attitude

The third cornerstone is *the philosophical* in information science, which is about philosophy as an act of thinking rather than a specific school of philosophy. The philosophical, thinking as a noetic endeavour, ‘is about human thinking and how

human thinking finds expression and fulfils an orientation function in many situations' (De Beer 2015:2). Thinking as a human characteristic requires reflection and questioning assumptions to avoid mutilated thinking, which happens for example when ideas are viewed from a singular, exclusive perspective. This is not only relevant to creativity, innovation and failure, but to science and knowledge (De Beer 2015:2-3). Such philosophical investigations should aim to guide science, practice and culture, by avoiding mutilation caused by destructive critical methods. In the context of the study, it includes considerations of the kind of science information science can become, implications for information practice, and how the concepts of the subject field connects to science, thinking and culture.

The meta-theories and philosophies within information science expose the epistemological positions of researchers in the subject field, and therefore their methodological approaches. Examples of influences that are elaborated on include those identified by Furner as already explicit in information science in the context of the enduring subfields or domains: empiricism, rationalism, metaphysics (being and existence), epistemology, aesthetics, phenomenology, and philosophical logic or truth (Furner 2010:163). In the face of such a 'plurality of approaches' (Furner 2010:169), the kind of discipline or science that information science could or might grow into, whether inter- (between, in-between), intra- (within) or meta- (over, above, about, mega), becomes pertinent for further consideration.

Information science cannot isolate itself from the debates and investigations taking place across disciplinary and scientific boundaries concerning the relationship between knowledge and theories, and knowledge and the sciences; what science is, specifically contemporary science; the study of information; and shifting and diffusing world views (Lash 2002). Similar concerns were already emphasised much earlier by Coetzee (1977). These developments have implications for information science, especially in claiming information and the information user as its foci.

Figure 2 represents a conceptual map of the exploration of the role of philosophy and the philosophical in information science. The general systems theory of Von Bertalanffy (1971) is mapped onto information science by applying the three main aspects of the general systems model to information science as: (1) information

science, (2) information technology, and (3) information philosophy. This is according to *intention*, not content; thus not ‘separable in content but distinguishable in intention’ (Von Bertalanffy 1971:xvii-xx).

The aspects of intention adapted are (1) systems science, (2) systems technology, (3) systems philosophy. Information phenomenon; information flow: ‘parallelism of general cognitive principles in different fields’ (Von Bertalanffy 1971:xvii); systems philosophy - systems ontology, systems epistemology, values. Change in basic categories of thought: wholes or systems, complexities in all fields of knowledge; thus, re-orientation in scientific thinking; new world outlook; Gestalt psychology; Unified Theory of Human Behaviour; social phenomenon as systems.

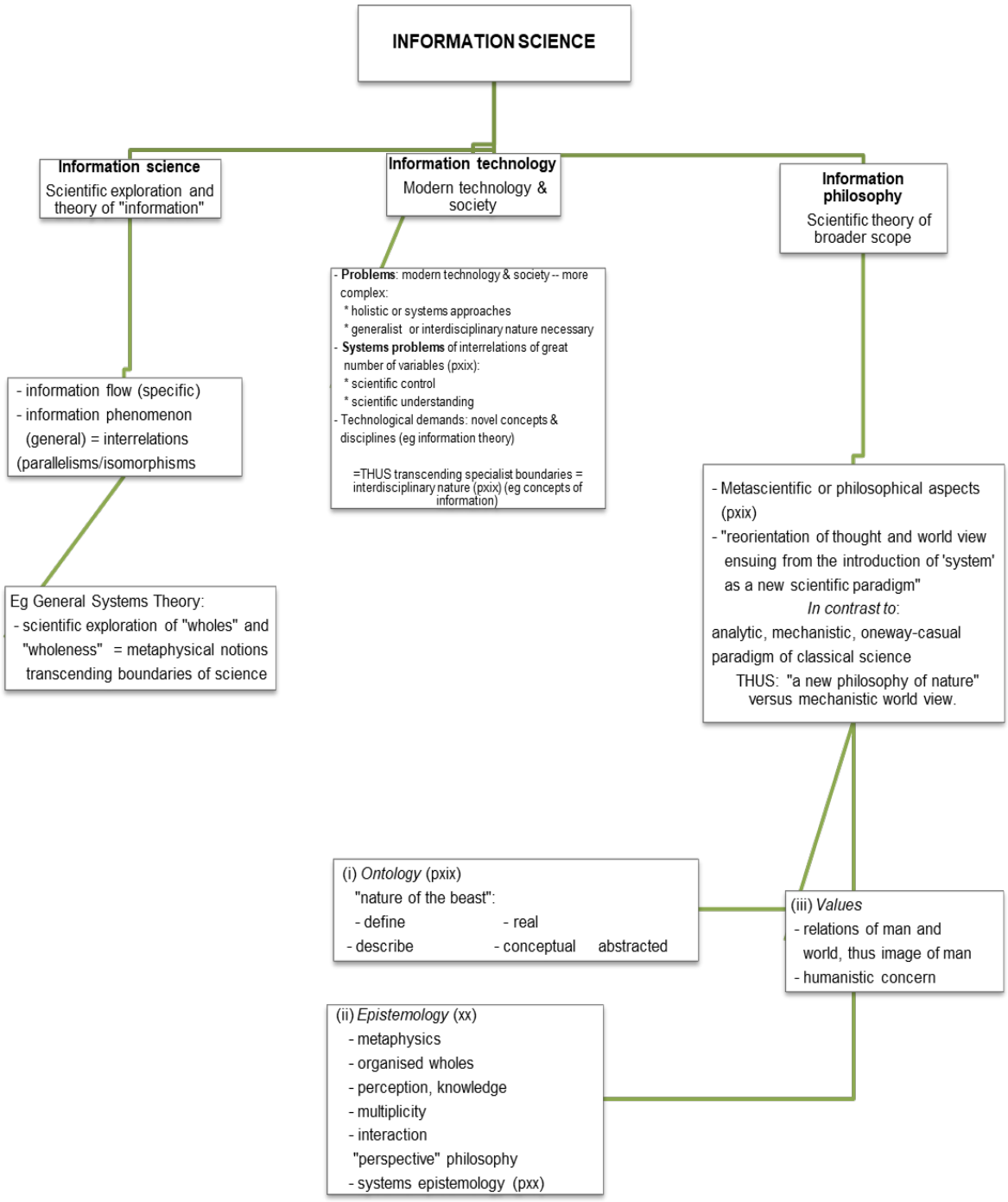


Figure 2 Conceptual map of the exploration of the role of philosophy and the philosophical in information science (map designed by the author)

1.6 Terminology

The key concepts clarified at the outset are information and knowledge, information science, and philosophy and the philosophical. The study recognises that the meaning and usage of words seldom remain unchanged over time, including how they relate to other concepts and contexts. This includes what words meant in the past and how people 'continue to use words as they will, finding wider meanings for old words and coining new ones to fit new situations' (*Online etymology dictionary* 2019). Contributing to the variety of approaches to how concepts like information and knowledge are used, are the multidimensional characteristics of each concept, as well as different scientific approaches towards them. Dictionaries are interesting by the very nature of the definitions they contain, which typically draw neat *distinctions* between words based on their individual meanings and contexts, and organisation of meanings. This may result in an artificial division or a separateness of words, even though terms may overlap, be ambiguous at best and bear resemblances to each other. We do not always categorise in terms of strict and absolute criteria but in terms of a series of overlaps:

> It is often forgotten that (dictionaries) are artificial repositories, put together well after the languages they define. The roots of language are irrational and of a magical nature (Jorge Luis Borges, quoted in the *Online etymology dictionary* 2019).

1.6.1 Information and knowledge

It would be misleading to present one definition, not only because there are many definitions available, but also because of the various aspects of the information phenomenon. Zins (2007b) identified different conceptual approaches to how information and knowledge are defined in the information science literature. The identified definitional approaches are interrelations in sequential order, information

versus knowledge or external versus the internal/mind, and as synonyms. The different approaches hold implications for the name of the subject field, Information Science, an issue ‘rooted in various subjectivist and empiricist schools of philosophy’ (Zins 2007b:480).

The word *information* means different things to different people, disciplines, organisations, leading to a situation of conceptual chaos and confusion (Schrader 1986:179-180). From the definitions of information, there are two common aspects that can typically be identified, namely the material or physical aspects and the content or immaterial aspects of information, also referred to as form and substance, message and medium. These two meaning aspects of information are not stated clearly in all definitions. The preference given to the material aspects of information seems to be symptomatic of the characteristic of humans to express mental processes into material symbols and cultural ideas (Debons, Horne & Cronenweth 1988:1-4, 158), which themselves comprise meaning or a meaningful message. This in itself makes a dual definition or understanding of information useful for explanation purposes, albeit an artificial division.

If it is accepted that information is the organisation of data and experience, leading to the reduction of, or increase in, uncertainty of an existing knowledge state and structure (Belkin 1978:79), then a strictly linear or hierarchical understanding of the relationship between information and knowledge cannot be sustained. What we find in a dictionary is information most often described in terms of intelligence, instruction and knowledge (Budd 2004:447). These terms point in the direction of truth connecting information and knowledge. Information is capable of yielding knowledge and because knowledge necessitates truth, so does information (Budd 2004).

To be informed is to experience change in the cognitive structure, therefore to inform is the action that brings the experience of change about (Kochen 1983b:374). This then, makes information much more than organised and communicated data (Lyon 1988:10). Ingwersen (1992a:309) supplies the connection in his definition of information as ‘generated and *perceived* data which may transform knowledge states *producing various kinds of action*’ (own italics). Information understood as reducing complexity or countering disorientation, implies that the change information might

undergo, takes place according to the context of its use and how it is measured. In this sense, information seems to be the organising factor for knowledge, information as potential knowledge, allowing the coexistence of multiple meanings; and knowledge helps in understanding when that information is meaningful or irrelevant (Debons, Horne & Cronenweth 1988:158; Wersig 1997:225).

Lash (2002) refers to the nature of information in the context of *forms of life*, and can be related to Wittgenstein's (1986) idea of language as interwoven with everyday practices and forms of life. The multiple ways in which information is used results in multiple meanings, especially when information is defined according to those uses. The broader application of the term information led to the subdivision of its meanings. Examples of such divisions include personal/tacit and public/explicit information distinction; the semiotic distinction according to the empirical, syntactic, semantic and pragmatic aspects; and division according to Popper's three worlds of physical objects, mental states, and objective knowledge (Bawden 2001:93-94). The postmodern description of the state of our knowledge indicates it as the 'state of our culture following the transformations which, since the end of the nineteenth century, have altered the game of rules for science, literature and the arts' (Lyotard 1984:xxiii), and corresponds to the transformation of our understanding of knowledge.

To know the state of knowledge, it is necessary to know about the society in which it is located. Scientific knowledge, therefore, cannot and does not embody all knowledge. Lyotard (1984:7) calls the alternative kind of knowledge that exists in addition to scientific knowledge, "narrative" empiricist and rationalist approaches to knowledge relate to the division of knowledge into theoretical, *a priori* knowledge and practical reason or *a posteriori* knowledge (Adorno 2000:79). The empirical thinking attitude views the mind as a blank slate that, without sensory experience, has nothing with which to form thoughts, thus associating knowledge with the quality of thought. The rationalist approach to knowledge, on the other hand, is that real knowledge is not based on the senses. Rather, the human mind has ideas from birth and arrives at authentic knowledge through pure thought. The empiricist and rationalist attitudes exposes through their contradictory values, knowledge as something that derives not only from sensory experience, but also from reason,

revealing the idea of direct and indirect knowledge. If direct knowledge is the things a person perceives, then the sense experience or indirect knowledge is derived from those very perceptions (Brook & Stainton 2001:1-3, 16). Knowledge is cognitive and includes everything that is in the mind and can influence behaviour. A similar distinction made between practical and theoretical knowledge, reflects different kinds of sources or origins of knowledge. According to this division, practical knowledge, similar to the empiricist view precedes theoretical knowledge and does not depend on signs or language, because the material of knowledge is sensations. Theoretical knowledge, on the other hand, does require signs, language to reflect and understanding the sensations in order to expose relations and form ideas (Derrida 1980:45). The way knowledge influences behaviour can be associated with the "image" (Boulding 1986) or view held by a person of the universe or how things seem to be. This "picture" is formed by the percepts that enter the mind, and how close gained knowledge comes to the perceived true existence of the world.

Gathering knowledge through observation may seem objective, but it includes subjective elements in the way that someone may describe a location or happening, thus modifying or changing that observation. The guidelines or rules gained from experience are useful for everyday living, but new and imaginative ways that go beyond mere survival require innovative approaches to new situations (Feyerabend 1988:158-161; Roszak 1986:22). Mary Midgley (1989) asks what knowledge is for in addressing wisdom, information and wonder. Even the narrowest kind of knowledge requires imaginative work by widening imaginative experiences and exposure to existing theories and ideas, allowing us to approach them with discrimination (Midgley 1989:49). The external world is often seen as the main source of knowledge to explain observable phenomena (Brook & Stainton 2001:21). However, the external world and observable phenomena are not the only sources of knowledge. Such a way of knowing about "things" is represented in and through thought, not about just what they represent, because they *are* what they embody. An individual also acquires knowledge through social agencies. The existence and extent of cumulative, social knowledge consists of personal knowledge, which in turn, is largely derived from social knowledge (Feyerabend 1988:158-161; Roszak 1986:22). Neither personal nor public knowledge are stable as both belief systems

can be overthrown or changed. Such revision is never in isolation from each other in the unique ways that knowledge is received, interpreted and used.

1.6.2 Information science

Definitions of information science can typically be grouped according to where the emphasis is placed regarding its core concepts, what it does (application, practice), what it looks like (characteristics, subfields, areas of study) and even the milieu it belongs to as academic field and/or profession. The typical emphases found are in the broad and narrow sense of information science (Kochen 1983b). The broad sense is mainly involved with information and knowledge, understanding and wisdom. For example, to interpret and address human needs, an understanding of how humans react to their own existence in the world and to the presence of others in that world, is necessary. Understanding these interactions often shed light on how humans understand and experience cognitive processes and manage their physical and mental environments (Kochen 1983b:374). People's reactions might determine how they view and interpret matters such as power and action, and their view of these things shape their reference framework or world view, including their pre-knowledge and existing knowledge (Eco 2014).

A distinction is made in a manner similar to Kochen (1983b), between the visible substrate of information science as the *paradigm above the water line*, and the invisible substrate of information science as the *paradigm below the waterline* (Bates 1999:1043-1044). This binary style division is useful in explaining approaches to information science and is not meant as an oppositional representation or understanding of what the field looks like or functions. The narrow sense of information science concentrates mainly on recorded material (physical documents, whether printed or electronic) as part of the explicit paradigm, concerned with organising collections and facilitating access and use.

The traditional information organisation and retrieval processes employed for the *intellectual* control of information resource devices are referred to as classification, indexing and abstracting. Cataloguing is used for bibliographic description aimed at

the *physical* (to be understood in its broader meaning) and visible control of information resources, whereas classification systems display how the universe of knowledge is categorised and the theory behind such systems are constructed, by classificationists such as Melvil Dewey and SR Ranganathan, who were known philosophers. The core activities considered were considered to be making selections from an ever-growing record, bibliographic control and maintenance of collections, and user guidance (Kochen 1983a). Ingwersen (1994:198) identifies core elements of information science that likewise reflect the core tasks, that is information seeking, retrieval and management, information retrieval systems design and informetrics. The following definition of information science reflects these tasks:

> the study of the gathering, organizing, storing, retrieving, and dissemination of information (Bates 1999:1044).

Bates (1999) uses Borko's definition of information science that includes aspects spanning a narrow and broad approach, namely investigating the attributes and "behaviour" of information; the forces that direct the flow of information; ways of processing information for access and use; and the body of knowledge relating to information organisation, collection, storage, interpretation, transformation and utilisation. This reflects a subject field with a pure science element as inquiry into the subject), as well as an applied science component concerned with application and the development of services and products (Bates 1999:1044). The focus was mainly on the process, with use as the main goal, and not on its ultimate purpose, which is to know and understand. By emphasising the pragmatic roots, it seems as if it is not about anything more than mechanised, efficient access (Shera 1983:383). The idea of desired information is reflected in Ingwersen's (1994:198-199) definition of information science, which focuses on the communication of information to humans, conceptualising and understanding the information environment, needs and seeking of individuals and groups and organising information resources for successful access to the desired information. The quality of such interactions is determined by ideas about desire and storage, and understanding information in a context beyond that of technology and science, allowing for flexibility that fits the human being.

Wersig (1990), before the contemporary dominance of the Internet, discussed information science in relation to how the role of knowledge is changing beyond documentation, particularly in the context of knowledge for action and the importance of interconcepts resulting from information science spanning disciplinary boundaries. Such a meta-field (Bates 1999:1044) cuts across the conventional academic disciplines, analysing the processes, such as seeking and searching, and domains, such as the universe of recorded information, to organise the subject content for retrieval. Hjørland (2002:422) asks what kind of knowledge is required by information specialists and which approaches are used to generate domain-specific knowledge. Nitecki (1993) views librarianship as a much broader concept than library and information science. The library is often linked to documentation, librarianship, bibliography, library science and information science, therefore sharing a historical link. The modern library, or information environment, still revolves around providing access to information sources (information retrieval) through the organisation and classification of information. This is irrespective of whether these resources are physical, digital or online. Garrett (1991:382) in his reading of Umberto Eco's novel *The Name of the Rose*, refers to the library as:

> one of the most visible and important temples that society has erected to this belief …[a collective belief] in the existence of a scientifically derived and classifiable body of knowledge.

Reuben Peiss in his translation of Hessel's work (Hessel 1955), identified the existence of an affinity between philosophy and the library field in the understanding of 'philosophy, as the love of knowledge, and libraries which are repositories of knowledge' (Hessel 1955:viii). This is echoed by Jesse Shera's comment that librarians deals 'only incidentally with things but primarily with ideas, concepts, and thoughts' (Shera 1983:384). Despite the long philosophical history of librarianship (Nitecki 1993), much of the research undertaken in library and information science still favours practical concerns and short-term solutions, and less research efforts that contribute to a better understanding of meaning and knowledge. One could argue that such a narrow approach reflects a certain kind of philosophical position or even a lack thereof.

Erwin Schrödinger stated in 1964 that knowledge obtained within the confines of a particular discipline remains isolated in a narrow field. For such knowledge to be of any value or significance it has to be synthesised 'with all the rest of knowledge' (Schrödinger in Royce 1964:1) to be able to contribute towards answering core questions. The danger of provincialism, or parochialism, must be avoided; that is, counteracting a belief that one discipline on its own can be the only right path to truth. Such a narrow approach cultivates a narrow view. Any discipline or field of study should acknowledge and interact with that which lies outside its own borders through critical and *inventive thinking* (De Beer 2007b, 2008a, 2008b). Few disciplines came into existence in isolation and information science as such contains many interdisciplinary characteristics. Dick (2004:359) argues for the benefits involved in the cooperation between what he refers to as the two research communities, namely the philosophy of information and the history of information. His main concern is the lack of cooperation between them at strategic and intellectual levels.

1.6.3 Philosophy and *the philosophical*

It is important to distinguish between *philosophy* and *the philosophical* or philosophical thought/attitude. This study does not treat these two concepts as synonyms, but does recognise their close relationship. *The philosophical* is about humans as thinking beings and the process of being philosophically engaged, rather than the philosophy of dogma and tradition. The philosophy referred to in this study is not specifically about the discipline of Philosophy, but the explicit and implicit philosophies, represented by frameworks and approaches present in information science. An example is Ronald Day's *documentarity* as the philosophical basis of the practice and theory of documentation. Documentarity is the philosophy of evidence, a 'philosophy of what comes into presence and makes itself evident, foremost in representation' (2019: loc 76).

Philosophy is conceptualised in order to indicate traditional and non-traditional ways of referring to the term *philosophy* and the approach taken in this study. Meta-philosophy, for example, is of a higher level in the sense that a meta-philosophical

question is a question not in philosophy but *about* philosophy; yet, philosophy seems to be one of the few subjects where meta-questions still form part of the subject. Questions about other disciplines (such as meta-economics, meta-physical questions) are also philosophical questions. Philosophy is understood from two perspectives:

1) Formal philosophies – their presence in information science can be argued, but their impact on people's reading, thought development, communication, language and literacy is evident.
2) The *philosophical* – philosophical thought is treated as the more pervasive influence in information science. It involves thinking, language and meaning.

Dictionary definitions of "philosophical" tend to focus mainly on it as an adjective, and relate directly to the definitions of philosophy as discipline. Many definitions refer to the possession of certain character traits as they relate to the nature of philosophy. Of greater interest, therefore, is *the philosophical* as philosophical thought or attitude as a way of thinking, more than formal philosophies. This concept, *the philosophical* is more related to the second sense or usage of the term "philosophy," as seen in the definitions of philosophy. Nevertheless, it can be informed or influenced by intellectual or formal philosophies. The philosophical is thus used as a noun, a specific *attitude*. The *philosophical* is not about the adjectival, or being an adjective. It is about a particular *attitude*, position or standpoint. The philosophical is 'a thoughtful attitude and disposition, and not a dogma or set of dogmas or specific philosophical tradition, to be utilised by any scientist even without making it explicit' (De Beer 2016a). This means that even though the *philosophical* remains morphologically an adjective, syntactically it becomes a noun, which is form plus function; and is to be understood as being conceptual and theoretical, not empirical: the philosophical process is the process of composing a meaningful lifeworld (De Beer 2016b:137). Deleuze and Guattari (1994:2-3, 5) define philosophy as

> the art of forming, inventing, and fabricating concepts … the philosopher invents and thinks the Concept … philosophy is the discipline that involves *creating* concepts (emphasis in original).

They also state what philosophy is not: ‘it is not contemplation, reflection or communication’ (Deleuze & Guattari 1994:6). Therefore, philosophical thought does not represent something vague and unidentifiable and its relationship to information science does not entail loose ideas and thoughts without structure. The relationship takes a different shape or approach to matters such as reason, logic and the physical and non-physical world of our so-called reality. Philosophical thought can vary from the very rigid and formal, to the ephemeral and open-ended, abstract expressions and impressions. The philosophical, then, ‘requires a free and spontaneous discussion and interaction about the meanings of texts’ (Boshoff 2017:382) thus creating dynamic movement of interpretation between the text and discussion, placing philosophy as mediator.

Flew (1984:viii) suggests that to understand philosophy and specifically philosophical approaches to problems, it would be more helpful to approach philosophy by offering typical philosophical problems, thus not about what it *is* but what it *does*. Two examples Flew refers to were originally put forward by Plato. These are “what is knowledge?” which is mainly concerned with logical and semantic matters; and issues of “freewill or predestination”, and “freewill or determinism.” The word *philosophy* is therefore used in two ways, the first in the more popular usage or interpretation, that is, as a world view. Heidegger (1996, 1997) distinguishes between *Weltanschauung*[7] from *Weltbild*[8]. The former is a view of life and our position in the world, the latter is a theoretical view of the external world, or world conceived as picture. Spirkin (1983) defines world view as ‘a system of generalised views of the surrounding world and man's place in it, of man's relationship to the world and himself, and also the basic positions that people derive from this general picture of the world’. World view is not simply a picture of the world taken in its integral form; it is the content, mode of thinking about reality and the principles of life. The second sense is philosophy as an intellectual or academic discipline, traditionally making use of argumentation and determining logical relations. Flew

[7] Direct translation: world view, outlook on the world.

[8] Direct translation: world picture.

(1984:vii-ix), though, makes it very clear that there exists a relationship between these two seemingly very different senses of philosophy. Philosophy as a world view, or *Weltanschauung*, involves more than the questions of the universe (Heidegger 1997). What is sought for, are explanations of human existence that result in world views. A world view is the attempt to come to an integrated view of the universe as it relates to the character of elements of the cosmos, such as matter, man, God, values and aesthetics. Roark (1982) quotes Aristotle in this regard:

> There is a science which investigates being as being, and the attributes which belong to this in virtue of its own nature. Now this is not the same as any of the so-called special sciences, for none of these treats universally of being as being. They cut off a part of being and investigate the attribute of this part.

Philosophy can thus be understood as a broad and inclusive search for knowledge, wisdom and truth about the universe; a desire for formal principles, reasoning, logic, a specific area of study, and a set or system of beliefs and attitudes; and a certain kind of "personality" or character with a specific attitude towards life. Philosophy is a combination of the Greek words, *philein sophia*, which together means lover of wisdom (Roark 1982). The philosopher, as the friend of wisdom, becomes a 'conceptual persona, or a condition for the exercise of thought' (Deleuze & Guattari 1994:3-4). In antiquity, philosophy had a comprehensiveness approach to life, thus including any area where intelligence was expressed. This is distinct from limiting the description of philosophy to what can be known by science or through the analysis of language (Roark 1982). Anton (2004) traces the transition from the original *sophia*, meaning skills, crafts and refined experience as knowledge of practical matters, to the ultimate level of *philosophia* as the theoretical virtues of the inquiring mind (Anton 2004:28). This move away from its technical use was before *philosophia* came to be used as meaning love of wisdom or the intellectual pursuit of truth. Of special interest is Anton's (2004:28) reference to what took place in this transitional period in ancient Greek cultural life:

> the pursuit of knowledge encompassed a new domain of investigation by increasing its scope from being the pursuit of

> knowledge of *physis* [meaning nature] to knowledge of the nature of the inquiring mind (italics in original) (own addition).

1.7 Outline of the chapters

The aim of the study is to investigate the relationship between information science and philosophy, specifically the *philosophical* thinking attitude in information science as revealed through its theoretical and practical concerns in the literature. This includes theory generation in information science as arising from the philosophical.

The context and content of chapters 1 and 2 specify the broad structure followed in the study regarding the relationship between information science and philosophy, as well as the terminology. The main themes taken forward from these chapters are the philosophical, language and information systems; information retrieval and classification; the information space (as real and as metaphorical) and the possibility of a multi-dimensional paradigm for information science of which interdisciplinary research forms a subset. The chapter division is according to the key aspects that address the role of philosophy concerning information science and the place of philosophical thinking and a philosophical attitude.

The focus of chapter 3 is the role played by philosophy in information science according to three pathways. The third pathway acknowledges the significance of thinkers outside information science. For instance, Michel Serres' ideas on science, thinking and reading (1982, 1997, 2008), Bruno Latour (1988a, 1988b) on the sociology of knowledge, Edgar Morin's work on social paradigms and methods of scientific knowledge (1983, 1992), the explicit position of Louis Althusser (1990) on philosophical insights in science and the relationship with other disciplines, and the challenge posed by Gilles Deleuze and Felix Guattari (1987, 1994) with the rhizome as a theory of knowledge with multiple, non-hierarchical entry and exit points.

Chapter 4 addresses information practice, philosophy and language through the work of Peter Ingwersen (1992b, 1996a, 2001, 2011) on the cognitive perspective and information retrieval interaction, David Blair's (1990, 2003, 2006) treatment of information retrieval with language (philosophy of language) as a primary concern. The study is further situated within the information science field by considering readership, specifically the inventive act of reading and knowledge organisation, employing the contributions of Fanie de Beer (1999, 2004b, 2007a, 2011, 2013, 2016a) on information science as an interscience.

Chapter 5 is about a new dispensation for information practice, relating to *the philosophical* attitudes within information science; and draws on *the philosophical* and language together in information science theory and practice. The *multiple collective intellection* of Michel Serres (1982, 1997, 2008) is proposed as the organising quality for making multiple connections and comprehensive thinking possible. The contribution of the study is an argument for the special positioning of information science as a very central discipline in the gallery of the sciences.

Chapter 6 concludes with the implications for theory, practice and society, as well as recommendations for further research.

1.8 Summary

Accepting and explicitly using philosophic discourse to guide research still requires a critique of the philosophic approaches influencing the research and practice of information professionals. This involves the potential that epistemological and methodological approaches may hold for information science in general; and in particular those responsible for the organisation of knowledge and the dissemination of information, operating on implicit biases and assumptions. Furner (2010:187) made the observation that even though it is not easy to find sound defences of the realist view in the literature:

> most of us who are actively engaged in the tasks of designing bibliographic classification schemes, indexing documents in

> accordance with such schemes, and using those schemes as tools for finding documents of the kinds that we want, continue to act as if we accept the realist view as the correct one.

Furner's critique relates to the question of whether or not an increased focus on philosophy in information science is of any benefit or value to the definition and performance of information science theory and practice; and whether making visible the philosophical influences behind the practices of information science have a significant impact at all. Discussions about philosophical approaches or frameworks that inform theoretical and practical assumptions reveal an awareness of the historical connections and influences that many of these frameworks have had in information science. In the context of research, philosophy is about explaining the way things are using theories that might enable explaining things as they are or appear to be for a specific person (Henning, Van Rensburg & Smit 2004:14). Definitions may also vary according to the socio-historical era, the field that is making the distinction, and the individuals practising philosophy. Furner (2010:162) provides a broad conceptual definition of philosophy:

> [T]he nature of philosophy at this point in its history might emphasize its concern with the most basic, fundamental, or foundational of phenomena (such as action, beauty, belief, being, causation, consciousness, evidence, existence, experience, goodness, identity, intentionality, knowledge, meaning, necessity, rationality, reality, representation, responsibility, rightness, thought, time, truth, value, and virtue); its concern to ask the most basic of questions (such as "What is x?," "How do we know that p?," "Why ought we do a?); its promotion of, and reliance upon, the most basic of methods in answering such questions (such as analysis of the very concepts that are used in expressing the questions, analysis of the logical form of arguments, and analysis of the mental processes by which we interpret our worlds); and its pursuit of the most basic of goals (such as happiness, justice, peace, authenticity, consistency, power, and an understanding of the meaning of life).

CHAPTER TWO

MULTIPLE, INTERCONNECTED PATHWAYS: APPROACH TO METHODOLOGY

What we need is a multiple discourse … a discourse that undertakes many journeys following complex itineraries across multiple spaces that interfere with each other (De Beer 1991:179).

2.1 Introduction: The Three-World framework

This chapter sets out the research method and approach of the study. The nature of this study determines methodology, deriving the pathways from the literature. It is not anchored in any particular theory, but built on relevant and related concepts within a literature review and conceptual paradigm. The study does include three ideas as stated assumptions. The nature of scientific and scholarly communication is understood in this study as distinct from the research process (Mouton & Marais 1996:190). The four key methodological criteria for undertaking and reporting on research, as identified by Mouton and Marais (1996:189), are the theoretical, meta-theoretical, methodological and technical considerations (Figure 3). The type of research this study represents is situated within theoretical and meta-theoretical research, relating to the role of researchers as constructors of 'knowledge about the philosophical grounding of research' (Henning, Van Rensburg & Smit 2004:2). This type of role emphasises the discovery of ideas and insights, thus rooting research 'in philosophical beliefs about values, concepts, and the nature of knowledge' (Killam 2013:48). This does not imply that the methodological and technical research considerations are irrelevant. Refer to Figure 11 as an example of mutually dependent theories in the information science domain.

The nature of the research undertaken is theoretical, a conceptual approach that corresponds to Mouton's (2005) world of theory and his world of meta-science or meta-scientific inquiry. Mouton explains the knowledge domains according to a

three-world framework and the different forms of knowledge each world represents (2005).

The three-world framework (Mouton 2005:51-53) illustrates the levels at which research activity can take place, and represents different forms of knowledge and knowledge domains, summarised in Figure 3 and Figure 4.

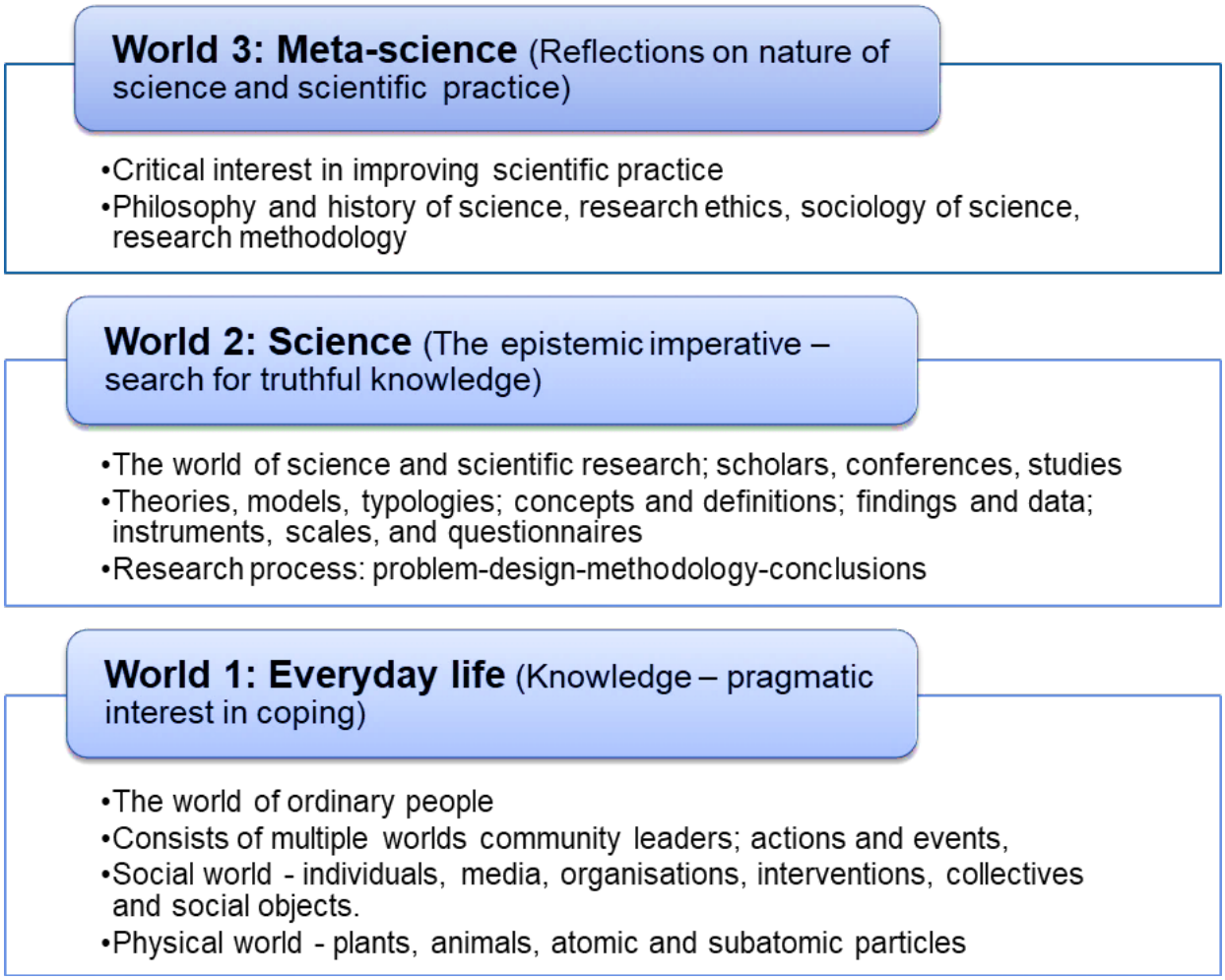


Figure 3 Mouton's three-world research framework (based on Mouton 2005)

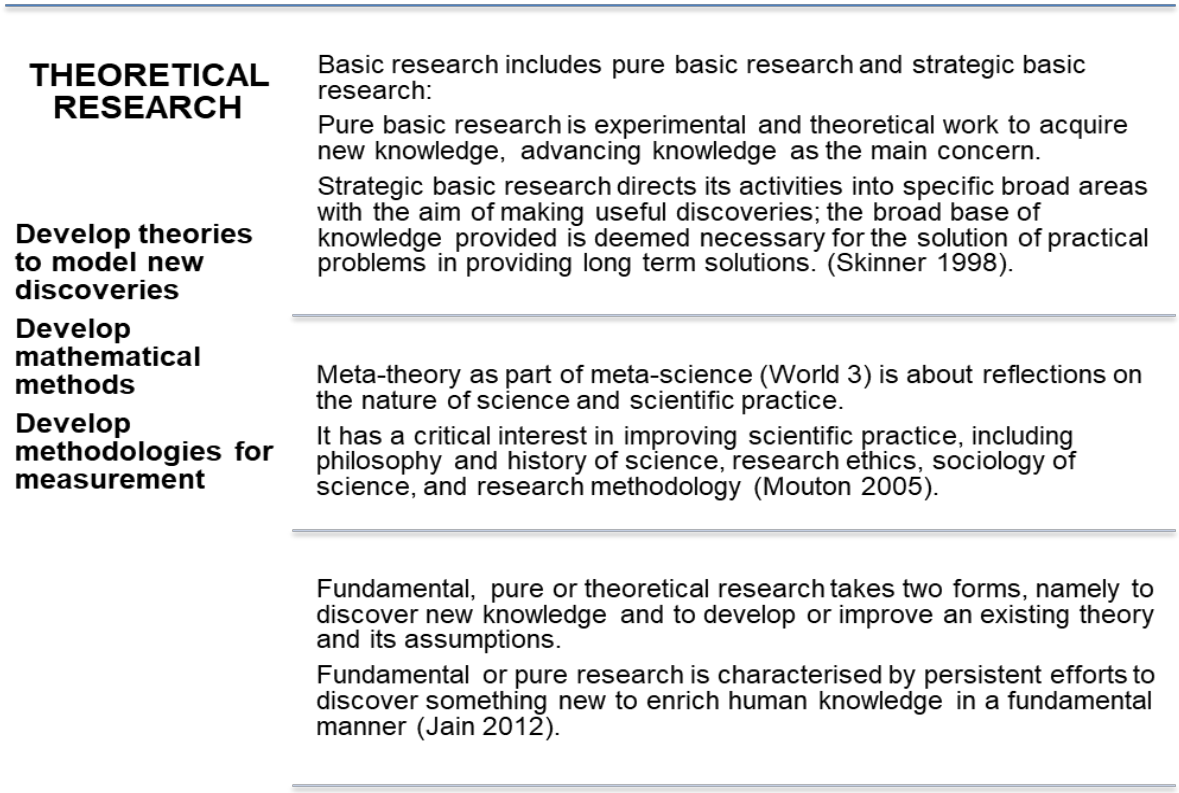


Figure 4 Theoretical research enquiry (based on Jain 2012, Mouton 2005, Skinner 1998)

Due to the social structure of research, there is not only one acceptable methodological, theoretical or meta-theoretical paradigm. Mouton and Marais (1996:190) maintain, though, that it is still necessary to make clear the central argument together with the reasons or arguments for why the argument or hypothesis is scientifically acceptable. A clear indication of the meta-theoretical assumptions, including the theoretical and methodological preferences and commitments, enables the evaluation of the scientific acceptability of the research on *internal* grounds. Methodology is understood for the purposes of this study, as an organising system of the methods or organising principles underlying a particular area of study, science, art, and so forth. Methodology is also *the study of* the organising principles and methods of research, the underlying rules, and the concepts and theories that underlie methods, also referred to as the underlying concepts of the methodology.

The research "world" that this study fits into is *World 3*, the world of meta-science. This world involves reflections on the nature of science and scientific practice; a

critical interest in improving science and scientific practice; philosophy; and philosophy of science, research ethics, sociology of science, and research methodology. Mouton's World 3 (Mouton 2005) can be linked to World 3 of Popper (1978) (Figure 5). Brookes (1980:125), for example, identified Popper's World 3, the world of objective knowledge, which includes collective knowledge, images, language and culture, as a niche for information science to explore this world as an extension of, yet distinct from, the world of documentation and librarianship. The world of documentation and librarianship is typically explored in World 1 and World 2[9].

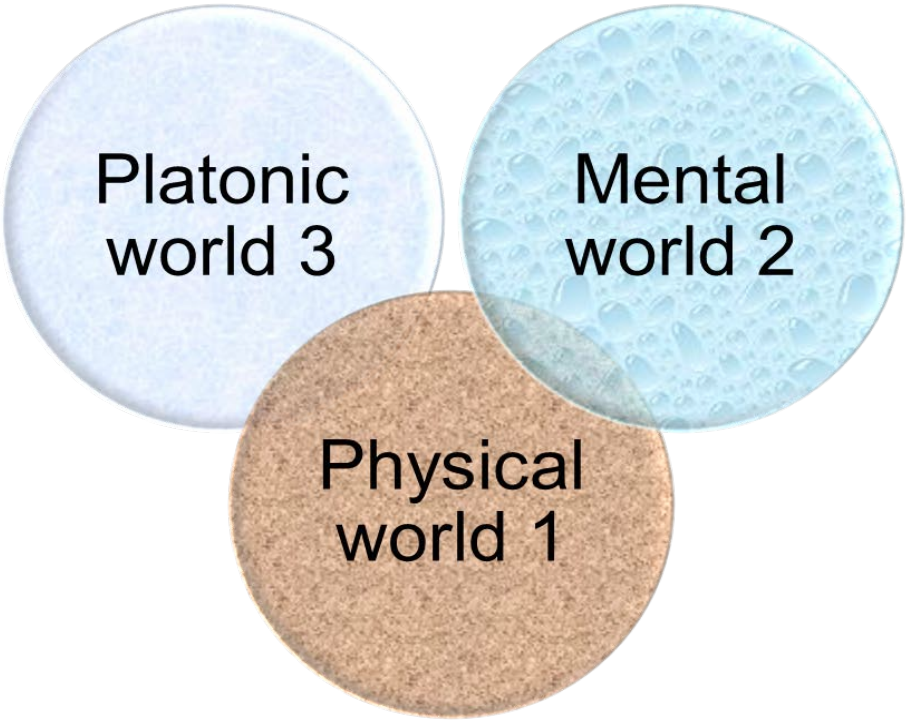


Figure 5 *World 1* - Manifest objects, states and systems (physical world); *World 2* - Individual states of consciousness, individual perceptions, knowledge, emotions (mental world); *World 3* - Collective knowledge, culture, images, language (Platonic world) (based on Popper 1978)

[9] Popper (1978) explains World 2 as the world of science and scientific research with an epistemic imperative in the search for truthful knowledge; theories, models, typologies, concepts and definitions, findings, data, instruments and so on. World 1 is the world of everyday life that consists of pragmatic knowledge with an interest in coping. The social aspect of World 1 involves individual human beings, actions and events, collectives and social objects; its physical aspect includes plants, animals, atomic and subatomic particles.

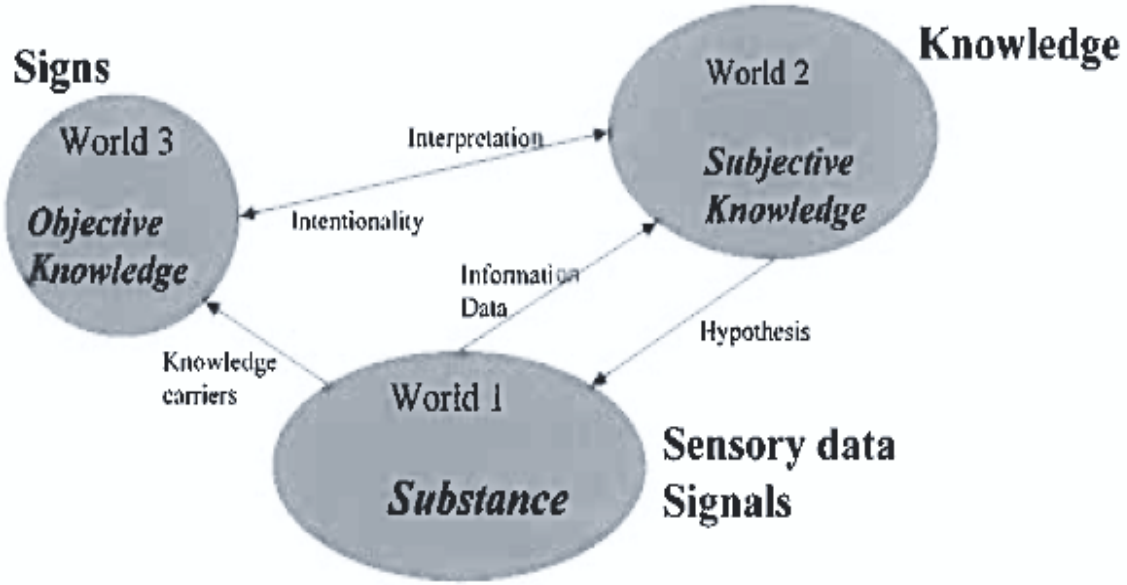


Image 2 Ingwersen and Järvelin's (2005) interpretation of Popper's three world ontology (image from Ingwersen & Järvelin 2005:49)

The use of methods is a journey undertaken in order to reach a destination. *Methodus* (Latin) means 'way of teaching or going' (*Online etymology dictionary* 2019, sv 'method') and *methodos* (Greek) is 'scientific inquiry, method of inquiry, investigation' (*Online etymology dictionary* 2019, sv 'method'). The journey aspect of *method* is in its original meaning of 'pursuit, a following after … from *meta* "in pursuit or quest of" … + *hodos* "a method, system; a way or manner" … "a traveling, journey," literally "a path, track, road"' (*Online etymology dictionary* 2019, sv 'method). The addition of the element -logy, which refers to a branch of knowledge or science, forms the word methodology meaning the 'branch of logic that shows how abstract logical principles are to be applied to the production of knowledge' (*Online etymology dictionary* 2019, sv 'methodology'; '-ology'). The Greek suffix *logos* is also defined as study, theory or principle of reason. Thus, the word *methodology* means a study of the journey to reach a destination or attain an end. The methodology is the *strategy* to best attain the research goal and objectives (Powell & Connaway 2004:286).

2.2 The theoretical and meta-theoretical knowledge domain of World Three

The methodological approach of this study gives preference to the comparative and pluralistic epistemology of a *journey*. This should help to avoid the danger of dogmatism to which a unified and systematic view of knowledge (Harari & Bell 1982:xxii-xxiii) might lead. Such an epistemology is a way of knowing that rejects existing techniques of traditional classification and separation, and necessitates a re-evaluation of contemporary science (Harari & Bell 1982:xxiii). This study is a literature-based discourse on theories and meta-theories within information science and philosophical movements from outside the subject field. Hjørland (2015:119) refers to these levels as the meta-level/paradigms of information science approaches and traditions, and the general philosophical levels (external relevant thinkers), in the context of theories and traditions of information science (Figure 6; see also Figure 11).

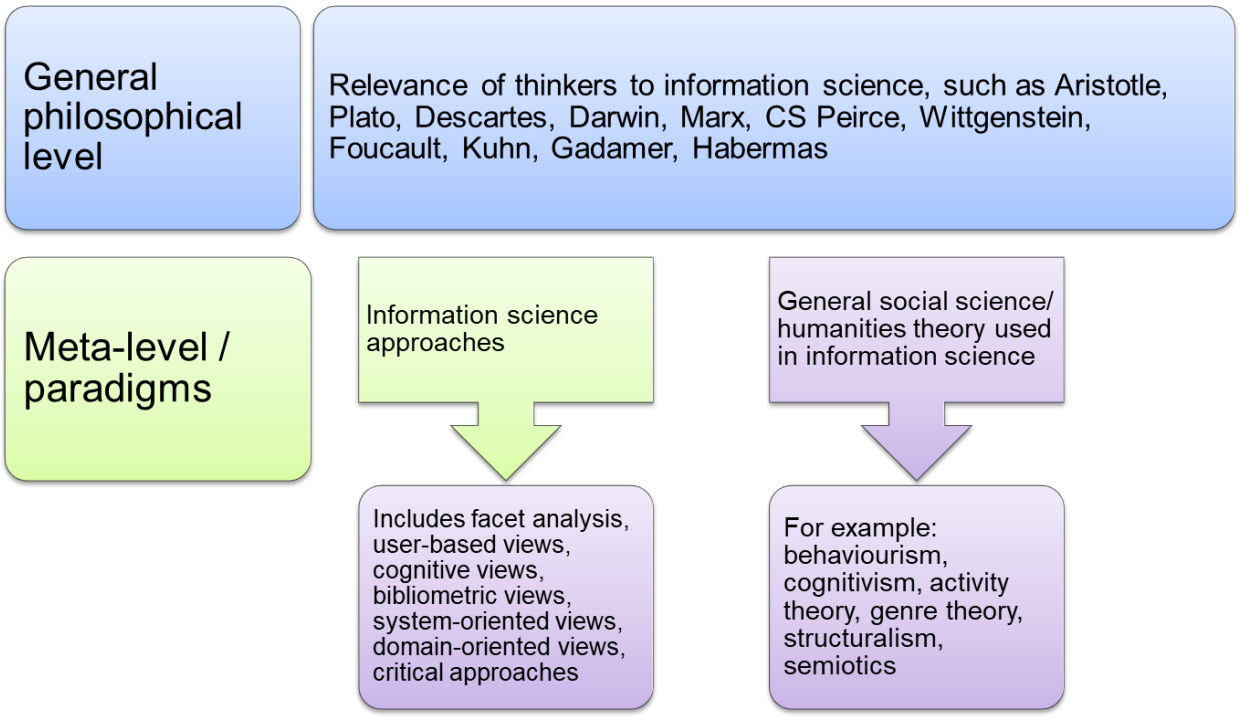


Figure 6 General philosophical level and metatheories level of Information science theories and traditions (based on Hjørland 2015:119)

Instead of using an instrument with pre-set and controlled boundaries and variables, limiting understanding by making it dependent upon those boundaries, the abductive

method of Peirce (1955) is considered ideal to the nature of the study. Peirce (1955) also refers to it as abduction or abductive reasoning. The abductive method is the method of inventing hypotheses, or ‘the operation of adopting an explanatory hypothesis – which is just what abduction is’ (Peirce 1955:151). It is a statement or proposition assumed to be true for the sake of argument. Such a statement is then to be proved or disproved by referring to evidence or facts. It represents a provisional explanation of anything where a situation can be idealised to create a more controllable source. Internal structures can be made observable for study and in such a way all signs and not just symbols can be studied. Similar to a working hypothesis, known results are proven if the hypothesis turns out to be true (Pearson & Slamecka 1982:201-202).

The theories, philosophies and practices from other researchers are analysed. Philosophical traditions and their bearing on ideas, theories, methods in the sciences and the arts across disciplinary borders reach far back. The implication is that there are sources read that also date further back, reflecting ideas that developed over time into their present or contemporary theories and practices. Refer to Figure 11, which represents the hierarchy of mutually dependent theories in the information science domain.

Studies of a philosophical nature can also be referred to as *meta-theoretical*. This category focuses on the more abstract dimensions of scientific practice, thereby including its nature, the underlying presuppositions and assumptions. The method or procedure is often holistic in nature, meaning that science is analysed in relation to other human activities with the intention to construe consistent scientific images (Mouton & Marais 1985). Creswell’s (2003) explanation of research design illustrates the philosophical and practical intellectual tools of the researcher, and the philosophical assumptions reflect the philosophical world view of the researcher.

Jain (2012) describes two types of research, namely fundamental, pure or theoretical research and applied research. Fundamental or pure research ‘makes persistent and patient efforts to discover something new to enrich human knowledge in fundamental fashion’ (Jain 2012). The first form fundamental research can take is the discovery of knowledge that did not exist before, thus leading to a new theory. Fundamental

discoveries are not always dependent on existing theories and often contribute to the basis of different theories). The second form fundamental research can take is the development or improvement of an existing theory (Jain 2012). Applying the three-world model idea, Saracevic's 1997 description of the place of information science as a then still "recent" discipline is represented in Figure 7.

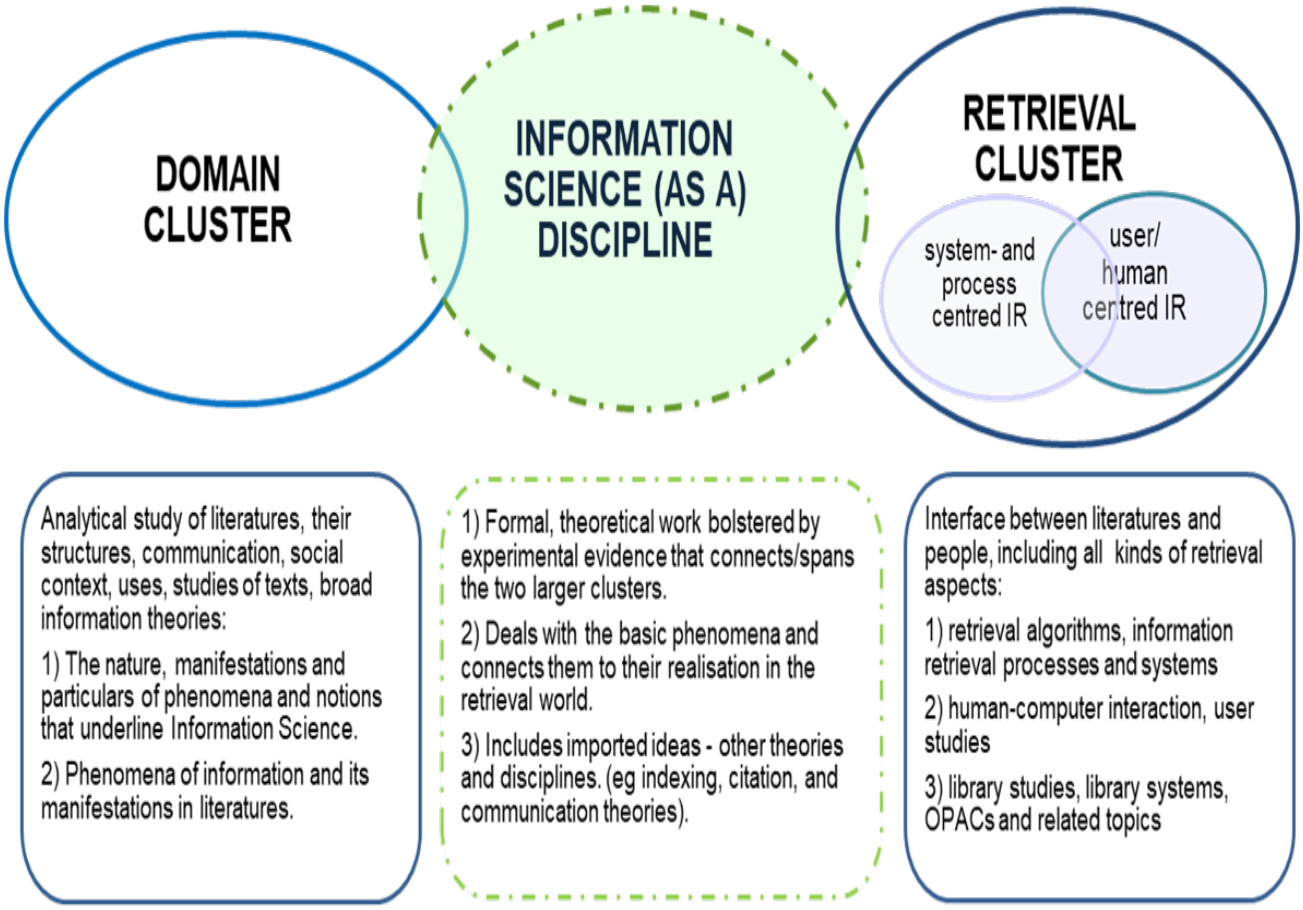


Figure 7 Two major sub-disciplines of information science: place of information science as a discipline (based on Saracevic 1997:21)

Figure 8, recreated from Hjørland (2015), represents information science theories and traditions. It can also be related to Mouton's (2005) world of theory and scientific inquiry in Figure 3.

General philosophical level	How are thinkers such as Aristotle (384-322 BCE), René Descartes (1596-1650), Charles Darwin (1806-1882), Karl Marx (1818-1883), Charles Sanders Peirce (1839-1914), Ludwig Wittgenstein (1889-1951), Michel Foucault (1926-1984), Thomas Kuhn (1922-1996), Hans-Georg Gadamer (1900-2002) and Jürgen Habermas (born 1929) relevant to Information Science?	
Meta-level/ paradigms: Information Sciences' paradigms and traditions	Information Science approaches include facet analysis, user-based views and cognitive views, bibliometric views, system-oriented views, domain-oriented views, critical approaches etc.	General social science/ humanities theory used in Information Science For example, behaviourism, cognitivism, activity theory, genre theory, structuralism, semiotics, new public management.
Theory level	The theory level is the level of the specific assumptions, which may guide practitioners' decisions. For example, users' utilisation of a library is inversely correlated with distance to the library; market forces form users' preferences; the most cited documents are the best documents; the most cited documents reflect the dominant ideology etc. Each theory is related to a metatheory, which is in turn related to the general philosophical level.	
Application level (practical activities done by information specialists	Helping users search for documents, information, knowledge and art; designing and evaluating search systems, classifications, ontologies, etc.; cataloguing, classifying, indexing and annotating documents; building and managing collections / Cultural Resource Management. Problems at the application levels are connect to the theories that information professionals have (and which have influenced their tools, e.g., classification systems), which are again connected to metatheories, and again in turn associated with the general philosophical level.	

Figure 8 Information science theories and traditions (recreated from Hjørland 2015:119)

2.3 Interpretation and understanding

Hermeneutical analysis of the literature on information science and its philosophical attitudes includes aspects of the interpretive research approach and shapes how meaning is produced. The hermeneutic aspects of scientific work relate to the role of observation and perception in explanation (Harré 1985; Latour 1988b). The goal of hermeneutics to improve, understand and reflect falls under the observation category of scholarly literature (De Beer 1999; Cunliffe & Jun 2005). The actions of human beings involve language and writing, hence how their feelings and thoughts are represented in the actions of language and writing. A researcher tries to make sense of, or interpret, a particular phenomenon in terms of the meanings attached to that

phenomenon in relation to their understanding of the world, thus finding textured or deeper meaning (Denzin & Lincoln 2000:3; Henning, Van Rensburg & Smit 2004:3, 7). The approach of hermeneutics to language, especially contemporary hermeneutics, that it is the 'most fundamental *opening* of the world' (italics in original) (Van der Heiden 2011:3), recognises the ambiguity in how language can make visible and disguise. To be able to understand things, access is required and language offers disclosure by bringing about the appearance of things, thus making understanding *thinkable*. In this sense, striving for one, perfect, universal language will ultimately conceal rather than reveal the effort to eliminate ambiguity and attain "one voice". A universal language will also have to discount not only the creativity of multiple human languages themselves, but also the differences, translations, interpretations, repetitions and representations between languages (Van der Heiden 2011:5-6).

Complex networks are characterised by multiple and impermanent passages, a plurality of routes, intersections and overlapping domains. These interconnecting relations link to multiple messages, the interconnectedness and interdependence of information, the complex interlacing of discourses from various sources and the inventive convergence of routes and paths of multiple discourse (De Beer 1991). The philosophy of information offers information science, by a focus on 'information and knowledge networks and interdisciplinarity … [an] acritical disposition' (De Beer 2015:3), a way out of the chains of ideology and its discourse blinded by its own tradition of critique. Going beyond interpretation as method, a 'beyond-method, of journeys off the beaten track' (De Beer 2015:68) is understanding the multiplicity and irreducibility of the world, where the scholar/researcher/scientist is a nomad travelling within, between and across a complex network of relations.

A philosophical approach is required to translate or transfer concepts into ideas and discourse that challenge conceptions of binary oppositions, fixed beliefs, a dominant or central position (Hoteit 2015:118). 'A method traces a route, a way, a path' (Serres 2008:259), not a single path in a straight line, but as multiple paths inclusive of complexity, inventiveness, new knowledge where '[v]oyaging begins when one burns one's boats, adventures begin with a shipwreck' (Serres 2008:278). This is not destruction, but deconstruction to break the singular mode, and mould, of thinking.

2.4 Poststructural methods and techniques

The poststructural approach of the deconstructive method often referred to in conjunction with the *inventive*, forms the theoretical framework of the study and helps narrow down a large body of thought. Deconstructive and inventive methods and techniques often form part of the critically oriented methodological approach, representing a drastic departure from positivist methods. Derrida (1978) critiques structuralist systems by way of the deconstruction technique. The poststructural movement is seen as a reaction against structuralism in the late twentieth century, and post-structuralist critiques challenged the notion of autonomous systems and questioned

> the possibility of the precise definitions on which systems of knowledge must be based. [This process shows by way of] close textual and conceptual analysis, how definitions of fundamental concepts [as dichotomies] (for example, presence versus absence, true versus false) are undermined by the very effort to formulate and employ them (Hjørland 2007).

In information science poststructuralism has also been discussed by, among others, Day (1996, 2006), Radford (1998), Radford and Radford (2005) and Tredinnick (2007). Poststructuralist techniques have the potential to examine large areas of information science theory and practice, and have been used in information science, for example to dispute positivist approaches to reading (De Beer 1991, 2016a), and to reveal deep assumptions and the nature of bias in retrieval tools such as indexes and classification schemes.

The poststructural approach is a theory of knowledge and language. The foci of the poststructural approach that supports its consideration as the theoretical framework for this study include:

- language as a structural influence on social life and its role in defining social reality
- its orientation towards issues of methods and epistemology that focus on language, meaning and symbols

The concept of language referred to here, is as a way of thinking and talking about aspects of the world that constitute a form of knowledge that functions like a language. Such languages are known as discourses and they enable us to talk about the world, or reality, and identity, thus forming the view that language directs how and what we know about the world. This "directing" is done by discursive practices linking thought, knowledge and action. In order to understand and interpret the phenomenon under investigation, namely the role of philosophy and the philosophical in information science, the multidisciplinary approach of the research process attempts to weave together theoretical considerations from different subject fields, while remaining anchored in information science. The position of this study is that conceptual frameworks that hold the promise of enriching contributions are those bringing in

> ideas from *outside* the traditionally defined field … or that integrate [and connect] different approaches, lines of investigation, or theories (italics in original) (Maxwell 2013:40).

The study deals with the literature and conceptual work, thus involving the domain of reading and interpreting texts by analysing theories or philosophies and practices from other researchers. Two methods used by poststructuralists to examine traditional assumptions about how we read and write, and cultural works and practices, are *intuitive interpretation* and *deconstruction*. The core features of these poststructural methods of interest include rejecting a superior interpretation or final meaning, and the capacity of deconstruction, also referred to as deconstructivism, to critique methodology itself, thus inviting a challenge of scientific work. This study recognises that the natural and physical sciences do not have or give final answers or solutions and that meaning has to be invented. Poststructural thinking opens the avenue for this invention and abductive reasoning keeps it from becoming random or

arbitrary. Sabbagh (2010), for instance, gives examples from abstract mathematics where approximate solutions to complex puzzles are accepted. Analysis, interpretation and explanation share one ultimate goal, namely the search for *meaning*. Meaning, similar to visual realisations in traditional aesthetics, approached as something fixed, somehow invested somewhere and simply to be discovered by the most persistent explorers is an assumption that seems to remain dominant. Inventiveness travels beyond this idea of a fixed meaning.

Interpretation is significantly different from analysis. Analysis breaks down, divides and seeks to make manifest the operative elements in a situation under investigation. Interpretation builds upon analysis through a process of synthesis and by creating further meaning from the analysed text or data. The context of the interpretation, *together with* analysis, should form part of the research goal of research. Where the goal is to enhance understanding or intelligibility, an interpretation will vary from being the best possible one under given circumstances, to being one possible version among any number of others. This conception of interpretation, which applies to text analysis, is also characteristic of deconstruction. What a researcher sees and discovers is closely linked to the world views and patterns of assumptions brought into the investigation by the researcher, thus influencing the nature of the attempt to understand the phenomenon under investigation. Any attempts to apply systematic doubt and generalisability to less conventional methods to ensure that the knowledge generated is reliable, require an informed awareness of its undergirding assumptions (Morgan 1991:223-231). Examples include the drastic departure of postmodernism from institutionalised sciences and their exploration, observation and participation research designs, in order to allow for alternatives and inevitable changes and resisting the Cartesian split between body and consciousness, image and text. Another example is phenomenology in the area of reading and cognition, with an understanding of the role played by perception and consciousness in the reading process of texts as a mental act (Budd 2005:54-56). Language, a focal point of such perception, contributes to how meaning is understood, which forms an integral part of information science, including the question of whether there can be meaning without language. This is of particular importance to the subfields of information retrieval, readership and knowledge organisation.

Two categories of study that relate to how the role of philosophy and its importance are understood are studies of a philosophical or theoretical nature and studies focusing on practice. The broad and narrow approaches in information science reflect these two categories (Bates 1999). The narrow approach (applied) involves specific processes related to information, for example acquisition, organisation, storage retrieval and dissemination, of which the user is the key focus. The broad approach (theoretical) is about aims and results (Malan 1978; Wersig 1990; Bates 1999). The validity and reliability of findings are viewed as crucial aspects in the sciences and in the emphasis placed on the scientific character or spirit of research rests the most important rationale for methodological reflection and analysis. The purpose of research methodology is to develop and articulate strategies and methods to heighten the validity and reliability of research findings. The categories of study or work about the structure and processes of the humanities, are studies of a philosophical nature, the methodology of science and studies that focus on the practice of research, the research design, by establishing guidelines for doing research (Mouton 2005:89). These two categories reflect two thinking styles, namely meditative thinking and calculative thinking, identified by Wersig (1990) and Weizenbaum (1984).

2.5 Comprehensive thinking

Thinking plays a role in how insight into things is gained and understood, seeing connections between them, gaining knowledge and connecting what is imagined with what is known. When thinking is closed, it often collides with new and/or thoughts seen as *other*, thus intentionally, or unintentionally, also opposing different ways of knowing. Thinking that is open and revealing offers space and a place for the other, without hierarchy or supremacy. Such thinking is independent thinking, inventive thinking and creative thinking. Matters that are crucial in understanding the role of thinking include the cultural environment and background to human thinking, the different types of thought or mental attitudes distinguished, and what activates and inspires thinking.

Meditative and calculative thinking are highlighted here to demonstrate the desirability of a *comprehensive* thinking style. By reinstituting a more comprehensive relationship, the blind trust placed in modern science as the only reliable source of knowledge about the world can be avoided. Neither science as calculating reason nor pure intuition can encompass all the things that the world is. At most, it is an endeavour to conceptualise these things, allowing and tolerating the unreachable (Weizenbaum 1984:11, 277). Wersig (1990) identifies the two perspectives of knowledge as *aesthetics* and *calculus*. These perspectives are seen in other approaches such as knowledge as theoretical and practical, direct and indirect, sensation and mind, material and immaterial, empirical and rational, communal and individual.

Knowledge offers an explanation and an interpretation of the world, because it is about the world, as well as a construction of it, making it both calculus and aesthetics (Wersig 1990:195). Different purposes require different forms of knowledge and integrated systems allow for reciprocal dialogues, thus opening the canon of knowledge (Santos 2007, 2018). In the ecologies of knowledge (Santos 2019), for example, all knowledge is considered incomplete owing to deep epistemology variety. It is never about ecologies of knowledges *versus* scientific valid knowledge, but about *all* knowledge systems. This also applies to the aesthetic form of information, namely organic representation form, which according to Day (2019: loc 95) does not receive enough attention as part of its epistemic quality and practical concerns.

The human potentials in calculus involve control, empirical evidence and rational behaviours (Wersig 1990:191). Weizenbaum (1984:277) refers to this thinking style as scientific knowledge, calculating reason and instrumental reason. Positivism can be associated with calculus by making valid explanations, which must be compatible with general empirical laws, thus seeking laws beyond what is immediately observable. These laws, including the theories that become the basis of hypotheses, provide the language in which its natural laws are expressed (Radford 1992:410-411). Two influential developments following the Renaissance were the *ideological*, based on the answers provided by cultural and religious systems about the concrete

world; the other was the *scientific* model of calculus, depended on empirical evidence such as sensory experience. The scientific model of calculus became dominant due to the strong functional dimension of information technology developments, and was realised as the basis of rational behaviour, which distinguished humans from animals, but it also led to similarities drawn between human and machine (Wersig 1990).

The concept of knowledge was influenced by the suppression of aesthetics in favour of the potentials of calculus. Two of the principles of philosophy from 1644 of Descartes (2014), namely principles IX (Figure 8) and XXXII (Figure 9), are used to illustrate how what may seem to be oppositional ways of thinking are only modes, or general classes, of thinking:

> IX. What thought (COGITATIO) is.
> …
> XXXII. That there are only two modes of thinking in us, viz, the perception of the understanding and the action of the will (Descartes 2014: loc 2711, 2849-2868).

Principle XXXII (Figure 9) demonstrates Principle IX (figure 8) since to understand, to will, to imagine and even to perceive (by the senses) are all the same as *to think*, therefore what thought is (Descartes 2014: loc 2849-2868).

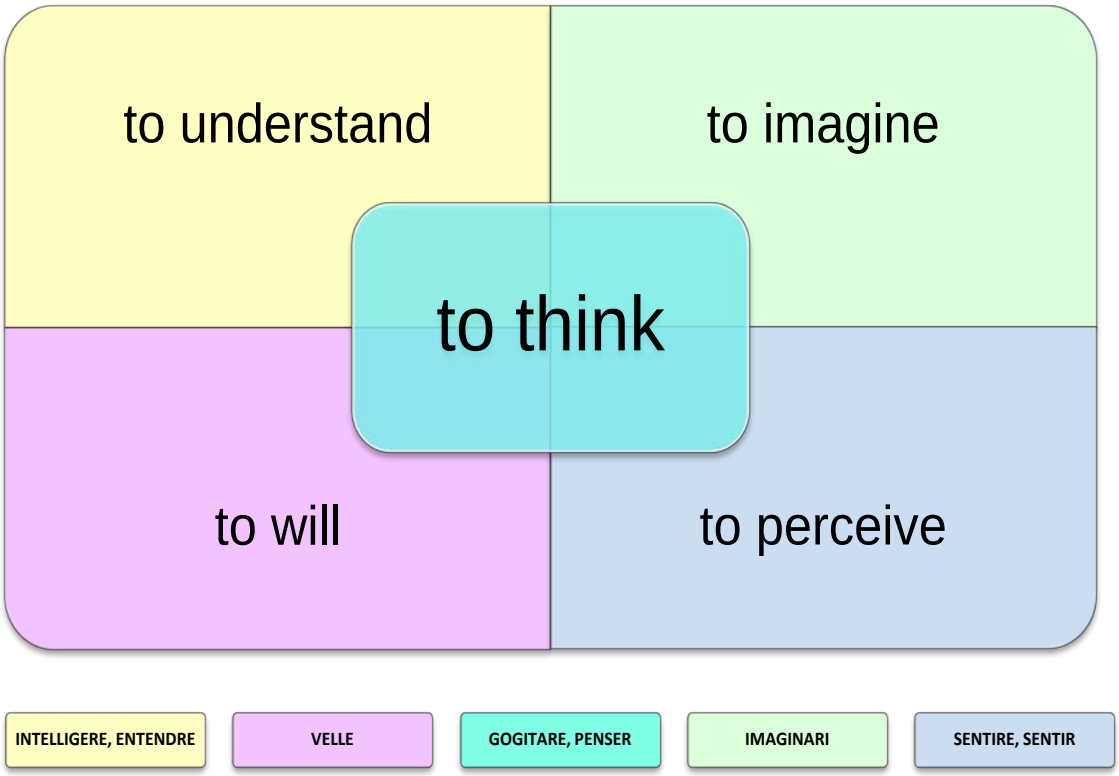


Figure 9 Principle of Philosophy IX: What thought (COGITATIO) is (based on Descartes 2014: loc 2711)

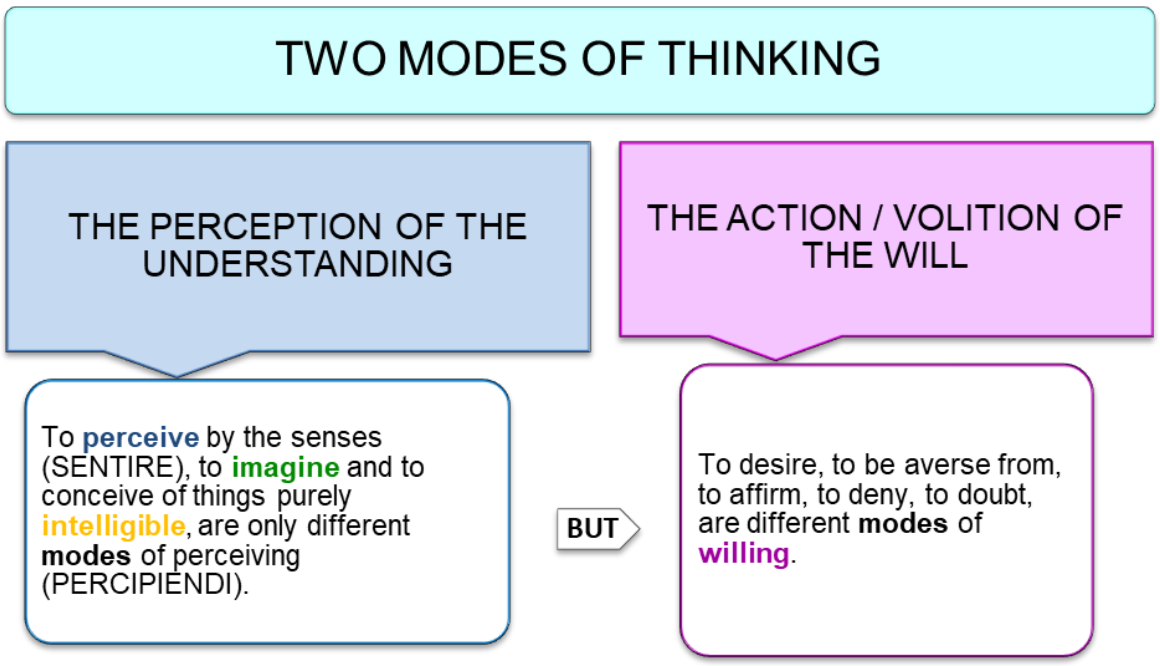


Figure 10 Principle of Philosophy XXXII: That the only two modes of thinking in us, *viz*, the perception of the understanding and the action of the will (based on Descartes 2014: loc 2849-2868)

How we approach information and knowledge reflects the philosophical attitude in our thinking, if we accept that research is

> rooted in philosophical beliefs about values, concepts, and the nature of knowledge … to appreciate these philosophical beliefs several key concepts and terms require consideration and understanding (Killam 2013:48).

For example, by clarifying or defining concepts in the same manner that knowledge organisation systems link “like” things together, a particular knowledge system or world view may be revealed. This does not imply that we can do without definitions; it is a conceptual view placed in context.

The aesthetic potentials of humans include myths, magic, rites, idols and religious beliefs, inherited from the historical development of humans (Wersig 1990:190-191). Aesthetics is personal knowledge, softer knowledge or pure intuition (Weizenbaum 1984:277). The potentials considered vital to providing more knowledge for humans (Wersig 1990:196-197), include:

- *images* – presentation mode that naturally combines aspects of both calculus and the aesthetic
- *language* – largest store of knowledge for aesthetics and calculus is natural language; the technological reduction of language to texts or databases can be overturned by rediscovering the magic of language in interpretation and analogues
- *objects* – this is a neglected form of knowledge that can sharpen the senses for aesthetic knowledge dimensions
- *storytelling* – a form of knowledge that includes world interpretation and the interaction of objects
- *personal knowledge* – the purest version of knowledge fixed to an individual, is used as a knowledge sources and shared in different spaces, including the virtual

- *staging of information* – the full knowledge potential is seldom used; yet, what is needed to offer knowledge as integrated communication are the full relation of knowledge to time and space, to stories and people, senses, thus the whole being

2.6 Summary

Human potential links the models of calculus and aesthetics to each other instead of oppositional. Potentials such as play, sadness, illusion and beauty relate the models to each other even in an environment that is predominantly scientific and technological in its focus on development and survival. Such a relationship allows for experiences (primary and secondary), generalisations, evaluation and skills as part of the conceptualisation of knowledge. The human potentials for calculus and the aesthetic, and the ability to control them and let them interact (Wersig 1990:191), are together the broader competence of knowledge. Knowledge is complex and stand in relation to the potentials that connect calculus and aesthetics as the broader characteristics of knowledge, including components such as experience, generalisations, secondary experiences, skills and evaluations (Wersig 1990). The object as affect, as infinite desire, of knowledge is the bridge between calculus and aesthesis (Table 2):

Table 2 Object of knowledge, of desire

CALCULUS	KNOWLEDGE	AESTHESIS
Reason Logic Rational	*Desire*	Feeling Emotion Affection, “affectiveness”

The following chapter, chapter 4, considers the relationship between information science, philosophy and the philosophical according to three pathways. The first pathway is the positions or attitudes of information scientists towards philosophy and philosophical concepts in information science; the second pathway is information

scientists writing about specific philosophers in their work; and the third pathway is the work of thinkers from outside information science who are of particular significance for research and practice in the field; and the third pathway.

CHAPTER THREE

PATHWAYS TO PHILOSOPHY AND THE PHILOSOPHICAL IN INFORMATION SCIENCE

3.1 Introduction: Approach to the literature

The purpose of chapter 3 is to investigate the role played by philosophy and the philosophical in information science according to three pathways. The objective is to analyse the pathways to philosophy in information science and the relation of these pathways to information practice. This study accepts the existence of an explicit and implicit relationship between information science and philosophy as revealed through the philosophical.

The approach taken to the literature is based on the assumption that information science is an inclusive and dynamic field, thus also acknowledging the continuity of the development of the field from documentation to information science and information retrieval. This inclusive approach is understood as embracing specialised application areas within a multiple, inclusive view that does not separate the theory of library science and documentation, for example, from that of information science. The consideration of the literature review is international in nature rather than separating general presentations from those that highlight specific countries or continents. Preference is instead given to the significance of the literature, which is dealt with according to the perspectives found in writings that reveal the multiple connections between information science and philosophy. The sources include special issues of journals, books and conferences, as well as works about central figures, pioneering work and theoretical approaches. Theoretical foundations of and historical writing about information science involve deliberations about key concepts of the field, conventional definitions and conceptions of information science and its central problem areas, its multiple underpinnings and boundaries as an autonomous

discipline. This includes works that particularly concentrate on philosophical ideas about thinking, reading and meaning in the context of language.

The first pathway taken to philosophy in information science is that of information scientists who make use of and address philosophers and philosophical concepts. The second pathway deals with philosophers who wrote about information and language, including those who focus on information science. These pathways do not represent or imply mutually exclusive divisions or groups. The aim is to sketch or map the philosophical landscape of the information science discipline as represented in its own and other literature, within the context of philosophy in relation to language and specifically in the information science domain of knowledge organisation (information retrieval and classification). The main object, or knowledge object, of interest in information science, namely the information phenomenon, is a connecting element between the pathways.

The question “Why philosophy, or, are philosophical approaches and viewpoints important to information science?” is pursued via the two pathways, identifying philosophical attitudes in theory and practice and exploring the relationship between *information and language* (language philosophy). In this context, the question is rephrased as:

> What can philosophy do for us (Information Science)?

Information science research is often guided or framed by visible or hidden philosophical attitudes and approaches. Examples include existentialism, phenomenology, hermeneutics, metaphysics, critical theory, semiotics and cognitive psychology. General theories that information science have in common with science, technology, social science and the humanities include behaviourism, cognitivism, activity theory, genre theory, structuralism, semiotics. Figure 11 represents the hierarchy of mutually dependent theories in the information science domain (Hjørland 2015:118). This may be seen as a kind of borrowing or even appropriating from other disciplines, but perhaps “deriving” would be more apt. Historical origins are often contested due to precursors of diverse disciplines sharing overlapping intellectual roots and influences, such as how the world is perceived over time and

changes in perspectives on the position of humans in that world (Floridi 2014). Hjørland (2015:119) lists the following examples of information science approaches: facet analysis, user-based views, cognitive views, bibliometric views, system-oriented views, domain-oriented views, critical approaches (see figures 6 and 8 for more detail).

There are other subject fields besides information science that are interested in similar issues such as the processes of information transfer, acquisition of knowledge and the meaning of the information concept, for example systems science, offering techniques and approaches of value to information science, without "losing" information science in an umbrella-role (Ingwersen 1984:87, 1992b:8). Godin (2006:6) shows that the forerunner to bibliometrics is the systematic counting of a discipline's publications started in the early 1900s by psychologists. Bibliometrics (proposed by Otlet in 1934) is attributed to the document and library tradition, informetrics (proposed by Nacke) and webometrics (coined by Almind and Ingwersen in 1997) to library and information science (Martín-Martín, Orduna-Malea & Delgado López-Cózar 2018:1254; Yang & Yuan 2017).

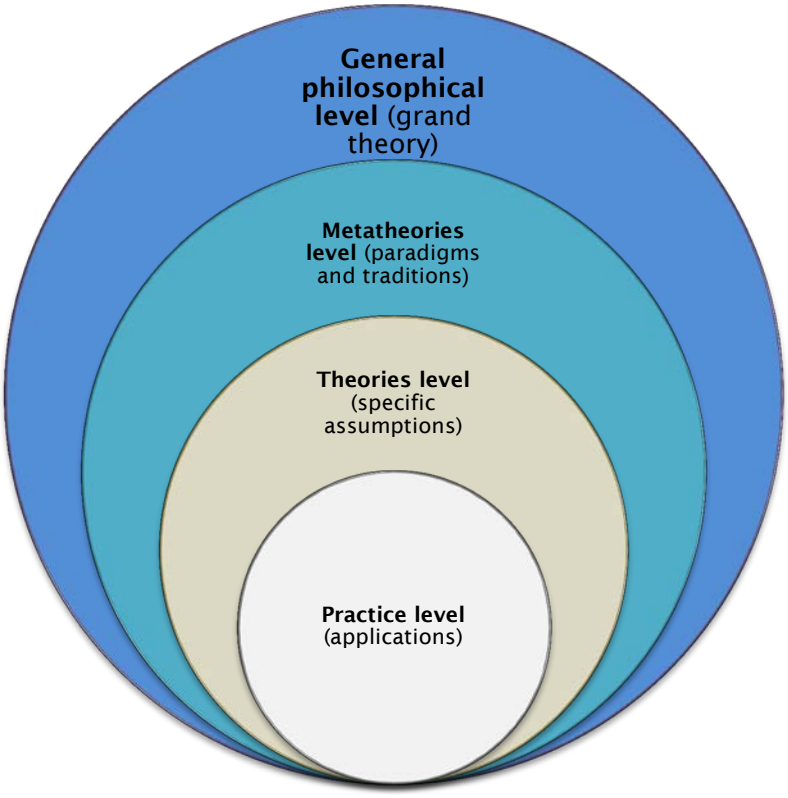


Figure 11 Hierarchy of mutually dependent theories in the information science domain (based on Hjørland 2015:118)

The approaches are typically stated clearly and applied to make a problem researchable and are influenced by factors such as the research field of the researcher, the researcher's research background and preferences, and the institution funding the research. The different approaches offer unique potentials for the growth of knowledge in information science. The information science domain of retrieval demonstrates the language and knowledge organisation connection. The sources that receive attention are those that reveal the general philosophical level and the meta-level or paradigms level. This does not exclude authors who write about the theory and application levels where they connect to the metatheories and general philosophical levels.

3.2 Pathway 1: Attitudes towards philosophy in information science

Attitudes towards the relationship between information science and philosophy represent contributions in the literature that (a) illuminate the question of why philosophy in particular is considered, (b) address the relationship between information and language, supporting philosophical thinking attitude, (c) demonstrate the interwovenness of the philosophical, language and praxis through the domain of information practice. The literature read relates to conceptions that shaped the theory and practice of information science and the evolution of science; understanding information, meaning and language; information science as a field of study and how philosophical concerns are made visible by the science-philosophy-information connections and the spectrum of human knowledge. This includes authors who explore specific philosophies in information science, including theoretical applications shaped by a particular philosophical attitude (for example explaining systems theory from a hermeneutic perspective), and philosophical frameworks in the context of sub-disciplines such as knowledge organisation.

3.2.1 Conceptions of information science and philosophical discourse

Information scientists' consideration of philosophies and philosophical concerns in information science may focus on specific perspectives or approaches, for example the cognitive view, phenomenology, positivism, constructivism, domain-analysis, critical realism, social epistemology, linguistic-philosophical and hermeneutical perspectives. This includes combined approaches and theoretical applications shaped by particular philosophical attitudes, for example hermeneutical approaches to information transfer. Certain philosophical frameworks are within specific information science domains, such as information retrieval and classification. Appendix A contains a summary of information science publications with special issues that discuss philosophical and epistemological themes.

Contributions in *Conceptions of library and information science*, edited by Vakkari and Cronin (Vakkari 1992:3-4), approach the object of research, the scope and central phenomena of information science from theoretical (philosophical reflection, theory building, paradigms), historical (origins, evolution, documents) and empirical (paradigms in research, systems and access) perspectives. Developing and creating theories and methods necessitates the continuous questioning of established ideas, applications and frameworks. The title of Vakkari's chapter, "Opening the horizon of expectations," is about the directions taken in research. The directions are not mutually exclusive. However, based on which areas and problems are deemed important, they will influence the theories, concepts and methods selected for research (Vakkari 1992:3). The first direction is to continue with traditional library and information service topics as the central phenomena of the discipline. The second direction is to continue broadening the object and problem formulations of research *outside* library and information service institutions in relation to other disciplines:

> The task was to look at phenomena connected with access to information and information needs and seeking in general, *regardless* of the way they were put into practice (own emphasis) (Vakkari 1992:2-3).

A holistic approach is inherent to information ecology and knowledge for action and accessibility and use (Ingwersen 1992:311). Rayward (1992) uses the metaphor of mapping that is the systematic and detailed synoptic outline of knowledge, as seen in Otlet's UDC (faceted classification). The classification numbers reveal the links of ideas and objects, showing their relationships of dependence and subordination, of similarity and difference (Rayward 1992:59). It is a new, genuine international scientific language, which is a complex system to represent science.

Topics addressed in periodicals with special themes that include whether information science needs a philosophy, with articles about different epistemological positions, methodological pluralism, libraries and the growth of knowledge, rephrasing the paradigm debate in *Library Quarterly* issues (especially of the 1990s); articles about the philosophy of information in *Library Trends* 2004 (specifically volume 52, issue 3), such as information and its philosophy, relevance, community as event, arguments for philosophical realism, cybersemiotics and information processing paradigms, epistemological foundations of knowledge representations. Information science and the philosophy of science is a theme addressed in the *Journal of Documentation* 2005 (in volume 61, issue 1), which includes articles about phenomenology, hermeneutics, grounded theory, communicative participation, "isms" in information science. The *Information Research* 2013 (volume 18, issue 3) contains articles based on the CoLIS 8 conference and is about the stream on philosophies, social and cultural perspectives on subfields. Refer to Appendix A for more specific information and details, including that of other publications.

Hjørland (2019b) refers to writings about theories, metatheories and paradigms in library and information science, summarised in Appendix B. Some of the examples, taken from Hjørland (2019b), include Egan and Shera who introduced the concept of social epistemology in 1952, but which was neglected for a long time in information science; Wilson who saw social epistemology as crucial and connected it to skepticism; the influence of Wittgenstein's philosophy on the work of Frohmann, seen as especially important in indexing theory and understanding the concept of information; Olaisen suggested broadening research by placing more focus on criticism and constructivism to counter the dominant paradigm in library science

(functionalism and logical empiricism); and Wersig's outline of the cognitive view and his suggestions on new theoretical directions with a common core of complexity.

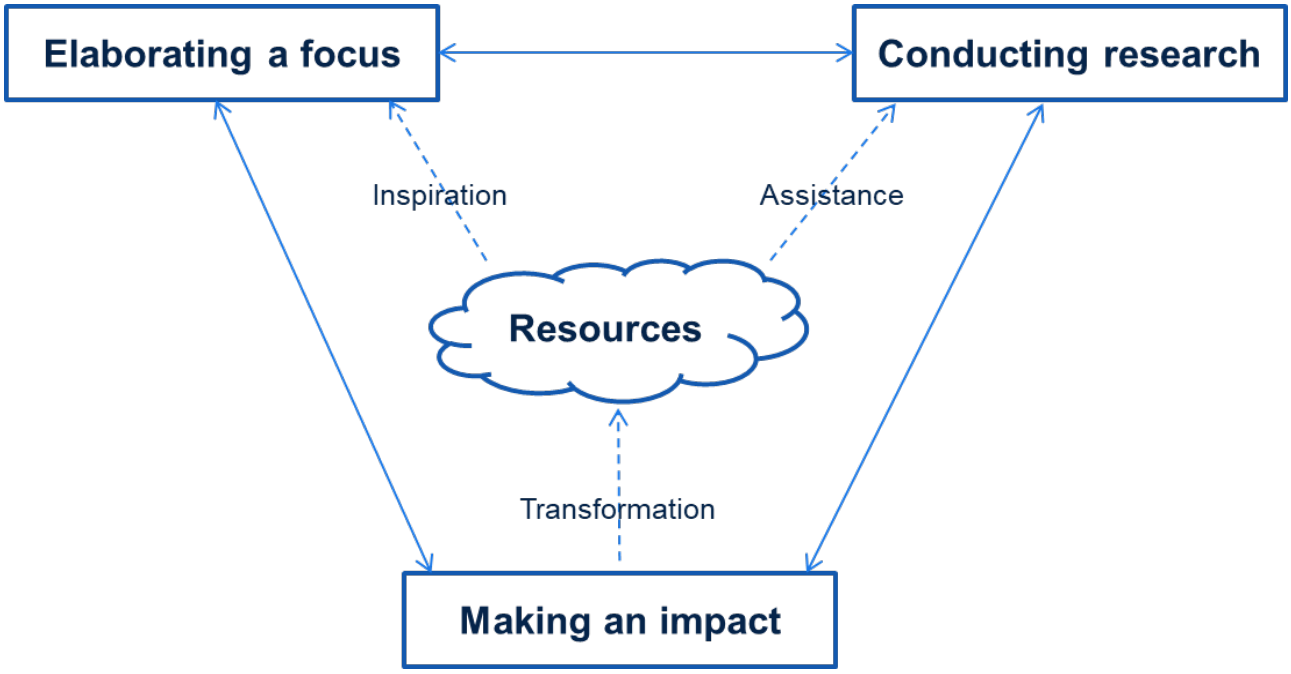


Figure 12 Stages of the theory development process (recreated from Sonnenwald 2016:4)

Kratwohl (1993) identifies different orientations or alternative research approaches in social science, namely pragmatists, analysers, synthesisers, theorisers, multiperspectivists and humanists. The characteristics of pragmatists include context independence, the classical norms of natural science (impersonal, value-free, precise, reliable, valid, causal, exact, etc.), and the use of instruments, operational definitions, and statistical prediction. Analysers are about validating hypotheses, reducing bias and have science as prime method; rules, principles and propositions are confirmed through the test of theory; and cause and effect. Analysers also make use of carefully designed studies, experimentation; integrate their findings; and value-free. Synthesisers, on the other hand, take into consideration variables and context, prefer a holistic approach, are concerned with values in science, and use generalisation; they work in natural surroundings (fieldwork) through observations; and take an interactive view on phenomena. Theorisers aim to find common patterns, make conceptualisations of reality, and use the method of intuition; abstraction (phenomenon), conceptual explanations and generality are

characteristics of theorisers. The multiperspectivists are similar to theorists regarding the abstraction of phenomena and the use of observations and examples, but tend to be less general in their approach. Multiperspectivists prefer the method of multiple hypotheses and multiple explanations.

Lastly, there are the humanists who build their own cognitive maps to draw parallels; they focus on learning to recognise patterns and adjust behaviour, the power to instruct, and causation as complex (Kratwohl 1993:625, 634-640). These orientations as identified by Kratwohl (1993) are found in the mix of methodologies available to the researcher, often determined by the research undertaken or the dominant paradigms in a given subject area. Information retrieval as part of the information universe, for example, involves linguistic, psychological, cognitive, social and technical complexities.

These concerns can only be understood and addressed if the information science field allows for a broader range of methodological approaches (Bates 1999:1048). Bates insisted that the field of information science '*requires* multiple methodological approaches to conduct its research' (italics in original) (Bates 1999:1049). This makes information science, in Bates' words, a meta-discipline that cuts across traditional disciplinary boundaries by researching and developing theories around the documentary products of other fields or disciplines. This locates the role of information science as a meta-science (Bates 1999:1043-1044) within World 3, the world of meta-scientific inquiry.

The impact of paradigms on research in information science is seen in conceptual models, including the existence of sub-constructs or paradigmatic levels within and between paradigms. Each paradigm is an alternative to the other and is not a relation of supremacy. New paradigms may offer more informed models of inquiry, but do not necessarily bring the inquirer any closer to the truth. Although it may not always appear as if information science does not have a master paradigm (Morin 1983:14), it is certain that different paradigmatic theories are employed in its research. It is assumed, for this study, that information science, having a constellation of paradigms, has a multidimensional paradigmatic status. Information science is therefore viewed as pre-paradigmatic *only* in the sense that it seems to

lack a key or master paradigm. This state of affairs is understandable if one considers the wide range of research topics, and problems that need to be addressed, as well as the methodologies available for each unique inquiry to be made. It is structured by theories, which in turn are each governed by principles, values and belief systems.

The paradigm plays a central role in theories, but is more than rules or the mere gathering of factual knowledge. It also guides the practice that flows from the theory, such as the research activities, methods and application. A paradigm cannot stand in isolation, because of its multidimensional reach and the humanness of the society or science it stands in (Ellis 1992b:46; Guba 1990:17; Morin 1983:12-18). Even though the interests of inquirers have changed over time and led to greater diversity, certain conceptual frameworks continue to dominate. The interrelatedness of the researcher's world view, the research questions asked and the techniques used, must be acknowledged.

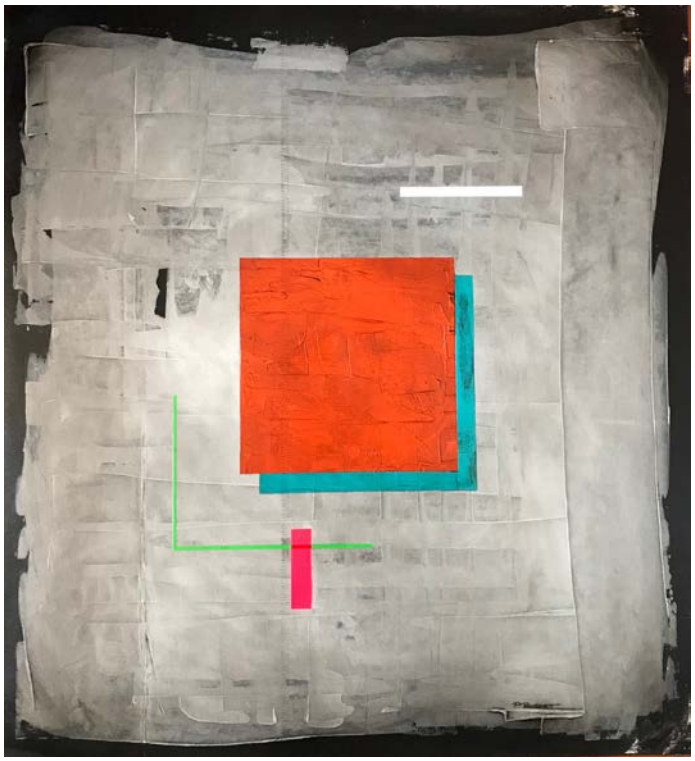


Image 3 *Paradigms* by Philippe Bousquet, 2018, acrylic on paper (photo supplied by artist and reproduced with permission)

The dominant paradigms found in research include classical positivism, post positivism, critical theory and constructivism. Of these, constructivism represents the move towards a contextual view. As a more holistic approach, it emerged to

reconcile mind and matter, as well as subject and object, as components of the knowing process. Human experience becomes central again in a collective identity. Constructivism is more than an accommodation between paradigms. Constructivism rejects the naturalistic interpretation and seeks out intersubjective meanings (Dick 1993:56-57). Efforts to understand the multidimensional reality made a conceptual reorientation essential. Context, unity, ecology and plurality are brought back into its inseparable humanness (Dick 1995:227-228).

The idea that philosophy serves the knowledge of librarianship culminated in De Beer's grounding of the idea that information science serves the knowledge of the philosophy (Gericke 2002:147), calling for the return of a spiritual and cultural base. This call asked for recognition of the dangers that the placing of a dominant focus on the technical or factual aspects holds for the retention of a deeper spiritual content. The then library science curriculum therefore, could not afford to have only a technically oriented training programme, but to first recognise itself as fitting into the humanities. Even though such a spiritual/philosophical base must also allow for technical training, which is essential to the information profession[10] (for example classification and cataloguing), it is the library world as a home for culture and not as a place of utility that is important. The technical then becomes 'embedded' in the spiritual as a component of the humanities and a slave of the spirit, thus displaying a strong spiritual base (Gericke 2002:148). Scientific research is not mere technique. Research serves a purpose and is never the goal itself but the means to an end, and should be applied to life. Any human activity within the sciences, as well as any other thinking activity, must take place within a determined socio-cultural milieu. This cultural milieu determines the kind of thinking that is applied. Science, therefore, is not merely a descriptive activity. It is involved in every aspect of everyday life, that is the natural and the social world (Gericke 2002:150-152). An important contribution by De Beer was to involve the understanding of science in the discipline of information science. This involvement made clear the need to broaden and cross boundaries. The rethinking of information science as a science of our times was an

[10] There are many debates on what makes a librarian an information professional or an information worker, but it falls outside the scope of this study.

important goal of De Beer, which fits within the transformation of knowledge and new image of scientific work (Gericke 2002:152).

Hawkins (2001) reviewed the changes in information science identified in the literature of the discipline. Of interest are the various historical attempts in defining information science and the new definition derived from the historical as well as the advances in technology. Instead of defining information science from a purely 'document-centric' approach to one that involves the internet industry. Hawkins describes it as a discipline that engages concepts from closely related disciplines into a cohesive whole that focuses on information (Hawkins 2001:44). The subject-map drawn of information science shows the relationship between interrelated disciplines, a core consisting of the basic subjects, and the related areas positioned around it. The distinctions between information science and librarianship are of concern when considering the development of a foundational definition. Hawkins, Larson and Caton (2003) aimed at taking the development of a new definition for information science further, enabling them to construct a map (a new taxonomy (classification structure)) that identifies not only the main subjects in information science, but also how they relate to subjects on the borderline of the discipline's main areas of interest. Frohmann (1992a), for example uses discourse analysis of the cognitive viewpoint to investigate knowledge and power in information science, and to redefine or even replace it with *information* power. This reflects the close link of information to knowledge as part of a dynamic relationship. For instance, informatisation is a form-giving activity of minds influencing minds. How information is described shows the problem of making information an *object* of study, making the term "skill" problematic, as it is not a sufficient expression of what it means to be human.

The central subfields or sub-disciplines that constitute information science practice are information storage and retrieval, information seeking behaviour and control systems (Summers, Oppenheim, Meadows, McKnight & Kinnell 1999:1157-1159). Their interdisciplinarity is revealed by their dependence on the context and support from the applied research of other disciplines, the most important being language. Practice-based studies according to Summers *et al* (1999:1159) revealed that the discipline of information science on its own does not hold much relevance for the

needs of practitioners. Even in the systems perspective the field required the knowledge and skills of many traditional disciplines, and therefore information science from the very outset became a field where people from numerous other fields were involved and imported the theories and methods developed there.

The need for documented information (whether digitalised or not) is more and more dealt with by a variety of fields, taking documentation beyond the boundaries of information science practice. Trends and activities that challenge traditional boundaries include the integration of theories, globalisation, hypertext, the direct involvement of the pure sciences with language and understanding, and the favouring of systemic thinking grounded in holistic principles (Summers *et al* 1999:1159-1160). The impact of these trends can be seen in internal efforts at reassessing the role of information scientists and whether approaches can, or should, be developed and promoted that characterise the multidisciplinary nature of information science (Summers *et al* 1999:1161):

> [T]he boundaries between disciplines will become even more fuzzy than they are now, driving the requirement for a multidimensional methodological approach … This will allow for a shared understanding of concepts, increasing the transparency of information theoretical approaches for the benefit of practitioners and clients alike.

The boundaries between disciplines were of course not always as “clear-cut” or rigid as they appear now, their fuzzy nature often obscured or erased from collective memory by how academic disciplines are divided, subdivided, grouped or merged. University curricula and the merging of academic departments (irrespective of the reasons for merging them) give an artificial impression of relations between the respective disciplines. At a broader level the imposed boundaries created and perpetuated the idea that the sciences actually exist in a natural state of isolation from each other, and by association their phenomena and objects of interest. The following section on the significance of contributions made by non-information scientists to the discipline exposes such boundaries for what they are – porous, permeable, often untenable and even unstable.

White and McCain (1998) used domain analysis to visualise information science as a discipline. Their results revealed, for example, the disciplinary affiliations of contributors to the field of information science; the major sub-disciplines and 'maps' of central subjects; a paradigm shift in the 1980s in information science; and the general nature and state of integration. If information is knowledge for action, then the kind of information science envisioned, needs to develop basic models by redefining broad scientific concepts, reformulate interconcepts and interweave models and inter-concepts (evolutionary, synoptic, trans-disciplinary).

There are four traces of the changing philosophical and technological role of knowledge (Wersig 1992):

1) De-personalisation of knowledge seen in communication technology
2) Credibility of knowledge affected by observation technology and digitisation
3) Fragmentation of knowledge (knowledge production, representation and needs): presentation technology; universe of knowledge – autonomy, final systems and pluralism
4) Rationalisation of knowledge: information technology; reducing complexity of knowledge

Regarding the evolutionary change in the role of knowledge, Wersig (1993a) does not explicate whether he is for or against philosophical inquiry in information science. His concerns are about the changing role of knowledge and the inability of fixed paradigms in addressing the so-called problem. Wersig attributes the change in the role of knowledge to the development of technologies according to the technological dimensions of depersonalisation and observation; believability and observation; fragmentation and presentation; and rationalisation and information technologies (Wersig 1993a:229-233). He uses these dimensions to discuss how the change in the role of knowledge is a change of its role for individuals, organisations and cultures. To him the change is *evolutionary*, not revolutionary, and consists of two dimensions. The one dimension is philosophical and the other technological. If information science sees itself playing a role in the new situation, it might have to

establish itself as a new science. If information science were to establish itself as a postmodern science, then the strategies and technologies used cannot be those of the classical sciences.

The new theoretical situation has different kinds of approaches in mind, identified by Wersig (1993a:235) as the development of basic models by redefining the broader scientific concepts, the scientific reformulation of inter-concepts (for example knowledge), and the interweaving of models and the inter-concepts. The shift in information science from a technical system-oriented view towards a user-oriented view, for instance, would require new system characteristics based on observations of users (Wersig 1993a:229). To be able to offer any long-term solutions, a science is required with a philosophical attitude that allows for scrutinising the deeper layers of problems in a study field. The alternative approaches suggested by Wersig (1993a:230) indicate the relationship between theory and practice. The solution-driven approach uses scientific reflection and research; and the problem-driven solution ideally leads to scientific solutions derived for the underlying problem investigated.

Nitecki (1985) discusses the implications of how an understanding of relationship between knowledge and information affects the practices of information science according to the concept of information-knowledge continuum. The essence of the information-knowledge processes is in the assertions that the nature of the reality of the material world is existential, and that its perception is either a selective and subjective response to external stimuli, or a response stimulated by a person’s own curiosity. This makes comprehension ‘always relative to the previously absorbed perceptions, interwoven into a system of personal relations known at any one time’ (Nitecki 1985:403).

The information-knowledge processes approach reveals that the various, often opposing, philosophical roles chosen by information scientists seem connected in the epistemological position preferred in research and applications, conceptions of information science as a science, and attitude towards the relationship between information science and applied information science. The model includes the empirical, rational and behavioural aspects information-knowledge processes and

the impact on the traditional concept of librarianship (Nitecki 1985:387-388). An understanding of human processes relates to private or personal knowledge that reflects cumulative social knowledge. Information in this sense is an inclusive term for perceptions of the universe clustered into integrated patterns, and knowledge as a state of relations known.

Nitecki (1985:388-389) identifies three categories in the literature, into which definitions of information are placed. These categories are information as a recorded message (carrier); as a process (activity/transfer); and as the content of a message (energy, idea, meaning). Similarly, three levels of interpreting knowledge are identified, namely conceptual (platonic focus, intuitive, rational); contextual (prescriptive, empirical); and empirical content (linguistic, rules, symbols). Knowledge, besides being an idea or an abstraction, is also open-ended and constantly changing. Studying the process of knowledge in an effort to gain an understanding of knowledge as a concept, rather than approaching it according to its definitions, is useful to gain insights into the information-knowledge relationship.

The conceptualisation of the relationship between information and knowledge as processes does have implications for information science. Nitecki (1985) explains the impact of information-knowledge processes on librarianship (the term used by Nitecki), using theoretical controversies to show how the concept of information-knowledge processes can clarify them. He uses the model based on a distinction made between an objective sphere of matter (external to the mind) and a subjective sphere of perception (thoughts about the matter), thus seeming to separate structure from substance. The model is not about separating form and content, but about a relational process, that provides a mental link between the physical world and a metaphorical world of ideas.

The kinds of misunderstanding and misrepresentation of what a certain theory proposes, show an ignorance of or indifference to the epistemological position of a particular theory and the philosophical thinking attitude guiding it (Nitecki 1985). The most appropriate way to study the nature of librarianship, whether as an object or a phenomenon, is within the larger study of the nature of humans, thus making it a ‘philosophical study of human information processes, not the scientific study of data’

(Nitecki 1985:405). This draws a distinction between the operational information science practices and the metaphysics of information science theory, distinguishing scientific investigations into phenomena, from that of philosophical efforts to gain an understanding of the ultimate realities of the world.

3.2.2 The question whether information science needs a philosophy

…*resistance to 'the New', or what Kling tellingly termed 'critical chill'* (Cronin & Meho 2009:407)

Many roads can be identified by different names to map philosophies found in information science. Attitudes towards philosophy in information science might illuminate how philosophical concepts manifest in information science. These include attitudes towards the role that philosophy and philosophical thought play from within and from without the field. In many approaches, references are invariably made to philosophy in disciplines other than information science. Explicit, open attitudes towards the position of philosophy in information science focus on how philosophy manifests in information science. The authors who reflect this attitude are those who recognise the existence of philosophy in information science and a need to develop it further, as well as those for whom there is already too much of it. The implicit, assumed attitude consists of authors who do not necessarily state their approach or opinions explicitly, but more often in a manner recognised by the context and environment of a particular research approach. Some authors also have oppositional attitudes. They find it unnecessary and not practical for information science to concern itself with philosophical manifestations in its theory and practice.

Authors whose conceptions of information science clearly acknowledge the importance of philosophy for the field represent the explicit attitude. Proponents of this attitude recognise the existence and contributions of philosophy in information science, and strongly advocate the need to continue exploring and developing philosophical frameworks that influence knowledge, understanding and practice. There seems to be an interest shown over time by authors in this group. Vakkari (1992:3) in *Conceptions of library and information science: historical, empirical and*

theoretical perspectives, referred in his opening address to a ‘new wave’ of dialogue about the nature of library and information science.

There are, of course, those who do not agree that philosophical approaches contribute in any meaningful way to information science theory and practice, that philosophical frameworks are unnecessary or impractical, or oppose the study or further development of philosophical approaches in information science because there is already too much of that. At the extreme end of this attitude, some researchers strongly deny the idea that there are any philosophical influences or approaches in information science. There is even a kind of animosity to be detected. Zwadlo (1997:105), for example, opposes philosophical topics in information science because he views them as borrowed philosophies, only to be returned and exchanged again for others, leading to a situation of having too many philosophical approaches. In their reply to Zwadlo, Radford and Budd (1997) expressed a concern with invisible philosophical or epistemological frameworks that influence information research and work, for example positivism, that go unnoticed. Recognising the presence of philosophical frameworks in practice is part of understanding the role played by frameworks on the nature and foundations of information science. Investigating different epistemological positions in and for information science is not the ‘mixing and matching’ (Radford & Budd 1997:317) of philosophical approaches.

Epistemological positions found within information science reflect approaches to and conceptions of the field. The more traditional and familiar positions include rationalism, empiricism, pragmatism, positivism, constructivism, and critical theory. In his argument for the recognition of philosophical realism in information science, Hjørland (2004a) highlights the confusion of specific concepts, namely empiricism and positivism with that of realism. Such confusion often leads to misunderstandings and sometimes even outright rejection of approaches such as realism. Antirealism (or idealist perspective), of which empiricism and positivism are examples, is widespread in information science, especially in assumptions about relevance in information seeking and retrieval research. Realism does not claim that all scientific knowledge is true or that empirical research should be based on the given of observations.

Hjørland proposes, instead, returning a realist philosophy (or pragmatic realism) to information science by means of domain analysis. He does not specifically argue here for philosophy in information science, but his accentuation of empirical research needing to 'recognize the theory-laden nature of observation' (Hjørland 2005a:488) underscores his argument for *philosophical* realism or a realist conception of aspects central to information science, such as information seeking and retrieval, and knowledge organisation. The link drawn by Hjørland (2005a) between problems in information science to that of philosophical problems seems to confirm the role of the philosophical in information science as a given. Antirealism, according to Hjørland, is often found in the cognitive sciences, which are typically grounded in representative theory or view of perception, focused on individual cognition. A significant statement by Hjørland is that those who subscribe to different theories and paradigms do see things differently and consequently formulate different kinds of questions (Hjørland 2005b). Thus, the questions we ask or problem areas we identify and, therefore, the assumptions that inform research in information science are shaped and guided theoretically, conceptually and linguistically by the particular philosophical viewpoints or epistemological approaches to which we subscribe.

Ingwersen (1992a) links a philosophical system, namely the cognitive viewpoint, to his *Information Retrieval Interaction*, making him an information scientist who works philosophically. Egan and Shera's *Social Epistemology* (1952) is another example of a philosophical way of thinking within information science. Budd (2005:44) refers to the presence of skepticism towards philosophical approaches to the field in some of the literature on library and information science. Hjørland (2011:72) views the philosophical foundation of information science as a given and recognises the problematic of philosophical contributions to core issues being ignored in information science, especially when such contributions are not formulated as criticisms. Day (1996) addresses method and postmodern science, the scientific method and the problems experienced by information science in justifying being a modern science discipline despite the epistemological crisis in modern science. Already in 1970, Husserl addressed the seriousness of a crisis in a science, for such a crisis interrogates the very nature of the genuineness of its scientific character, which in turn shapes the nature of the methodology developed to fulfil its task (Husserl 1970:3).

These viewpoints or approaches involve questions typically found in philosophy regarding the nature of the subject field, the meta-theoretical assumptions that guides and structures research undertaken, the methods chosen to find, shape and create knowledge in information science, including how inquiry in information science differs from that undertaken in other disciplines. Furner (2010) addresses the philosophy of information studies, especially meta-questions of or about the subject field. This seems to be supported by Floridi's (2002a, 2002b) consideration of philosophical questions about the subject matter of the information science field in relation to its scope, goals or purposes, methods, relationship to other fields, and its value or usefulness. The branches of philosophy that can be identified as having an impact on information science include metaphysics, epistemology, ethics and logic. These branches overlap with other subject fields, for example art theory, literary theory, linguistics, semiotics and history. Information related phenomena accentuate this overlap of efforts in understanding the nature of information. Information science draws from the theories and methods developed in many of these fields as seen, for example, in research efforts to understand the behaviour and cognitive aspects of information users. The latter example involves developments in the life sciences such as biology, psychology and cognitive science.

If epistemological positions and research paradigms of a research field are constructed or formed, whether from efforts of deliberate or unintentional origin, from the core theories and methodologies of a discipline as seen in explicit attitudes, then such paradigms and positions cannot avoid being a *simultaneous* reflection of the associated world views of the phenomena of interest, as presented in implicit attitudes. Such a reflection is not that of the mirror that can only show, give back or repeat infinitely what is held up to it, but rather that of the prism refracting white light and thus revealing or exposing the components of white light to scrutiny and analysis. This means that the overt philosophical attitudes and openly declared epistemological approaches also reflect implicit attitudes and influences; as a result, it complicates the distinction made between explicit and implicit attitudes. This complication is resolved by accepting that authors who do not explicitly state their attitude *towards* philosophy in information science, might be reflected by the philosophical frameworks present in their research.

A commonality the sciences share is the presence of an organising theoretical model broad in scope, which generates research questions. Methodological approaches and world view are generally integrally linked to these questions. These explicit theoretical models are usually well represented and described in the literature of a particular science or discipline and, according to Bates (1999), the same holds true for the explicit paradigm from which information science operates. What was of greater concern to her is that, in comparison, the *unconscious and unarticulated* aspects seem to have received much less attention. These unarticulated aspects usually result from a paradigm that has become such an integral part a researcher's thought processes and actions, that it is often interpreted as the "natural" ability of the researcher to understand the subject matter and interpret its various meanings, without being able to articulate it explicitly (Bates 1999:1043).

The role played by a particular philosophical position might be implicitly imbedded (not made transparent) in the research theory and methods, even in cases where the main research approach or paradigm has been identified. An author may not even show an obvious or noticeable awareness of having applied a particular approach. It is therefore not always clear from such writings which theoretical models and assumptions influenced and guided the research undertaken. Sometimes the only clues to the underlying epistemological position of a work are found in the sources consulted and/or authors favoured. This necessitates careful scrutiny of such contributions in order to identify any philosophical biases or epistemological objectives present, perhaps revealed by the opinions, thinking or application styles favoured and so supplying clues to the philosophical attitude present. Cronin (2004), for example, was able to relate the positivistic premises, assumptions and conclusions of Pierce Butler's 1933 publication, *An Introduction to Library Science*, to the entangled mass of current epistemological and ideological standpoints of current thinking attitudes in library and information science research. Cronin (2004) did this by critically analysing the central themes of the book in the context of the historic and contemporary significance of Butler's work.

Budd (2005) offers the phenomenology school of thought with its rich and complex history as one way to approach key questions of intellectual and practical concern in

library and information science. The contributions by Hjørland (2005b) and Cornelius (2004) are important examples of writings that include a phenomenological attitude towards information science. These approaches fit in well with phenomena as the key focus of information science, especially information and knowledge as they appear to our consciousness in their physical manifestations. Dick, in collaboration with Budd, aims to develop the social epistemology of Jesse Shera as a unique foundation for information science (Dick 2002a, Budd 2002b). Budd, Dick, Floridi as well as Radford (2003), recognise the natural relationship between information science and philosophy. The philosopher Luciano Floridi (2014, 2015), worked, amongst others, on the relationship between the human subject and technology. The reasoning is that technology is all-pervasive, that the human subject as knowing person and user of language makes use of technology (*techné*) and that information retrieval is just part of the technology-subject-information "system".

Egan and Shera (1952) introduced the term social epistemology, which today has become important again after being neglected for long in information science, but now seems to be undergoing a renaissance; in retrospect, an updated version of social epistemology may be the most important theoretical contribution to information science. Wilson (1983) argues that social epistemology is important for information science, connecting the view to skepticism (Pyrrhonian skepticism) as a 'highly appropriate attitude toward the productions of the knowledge industry' [and that] Skeptic, world watcher, librarian: all take the same attitude toward the world of ideas' (Wilson 1983:195-196).

Floridi (2002a) does not view social epistemology as a foundation for information science, but rather as 'sharing with LIS a common ground, represented by the study of information' (Floridi 2002a:37). His alternative is a new area of research, namely *Philosophy of Information* where information science is approached and defined as applied philosophy of information. It also involves computational and information-theoretic research. Floridi proposes that philosophy of information should replace social epistemology as the conceptual framework for information science. Floridi also questions cognitivism and "computervism."

Science, as a social activity, depends on communication regarding the ideas, models and results from the work of scientists in any field (Robertson 1994). The scientific pursuit and philosophy share the fact that philosophy never takes anything for granted and that it questions everything, considers serious reflections that digs deep into what guides issues, and that humans articulate and conceptualise their discoveries (giving meaning) (De Beer 2007a:181). This calls for a serious consideration of invention, creativity and critical thinking as essential to any endeavour, including those in the intellectual and academic milieu. It asks of the information scientist to be more than a mere discoverer, observer and re-presenter of knowledge. Science also has relevance for philosophy, and thus likewise for information science. If science is an intellectual activity first, and as such, an activity of thought (De Beer 2015), then reflection is a fundamental intellectual activity in science, placed within the context of new socio-cultural and knowledge landscapes.

These landscapes are important to information scientists since they involve ever-changing challenges. These fluid contemporary landscapes affect the information and knowledge world of the information scientist, making the conceptualisation of terms such as information and knowledge even more crucial. (De Beer 2015). These landscapes give a valuable focus to contemporary developments in information science, such as the Social Epistemology of Shera and Egan (1952), and the Philosophy of Information (PI) of Floridi (2002, 2004) proposed as possible key frameworks/paradigms for the discipline. The informativeness of documents (documentation), relating philosophy to practice, is dependent on practices and on what shapes and configures them. The configuring factors are materiality of documents, their histories, institutions in which they are embedded and the social discipline shaping practices to them (Frohmann 2004a, 2004b).

3.3 Pathway 2: Information scientists on individual philosophers

The benefit of philosophical schools of thought is that they offer new insights and improvement in information practice. To rephrase Althusser’s (1990:83) statement about philosophy being above all practical, what information and information science

is can be determined by practising it. One of the links made between information science and philosophy is epistemology and therefore knowledge and truth. Truth is what is sought and through its demand for the intermediation of theory and praxis results in statements that are true, insights that are genuine and decisions that are perceptive (Budd 2005:44-45). Information science shares with philosophy the ‘goal of truth and the consequences of the informed mind in society’ (Benoit 2005:160). A philosophical investigation into the core of information science theories and practices affords a critical look at what information science is about and what it does. Philosophy is supposed to assist in identifying and solving problems in a subject field. Herold (2004:374) refers to contemporary challenges such as new information policies and dealing with old and newer information objects and types, especially in the context of the effect of non-physicality on how records and storage, for example, affect assumptions and definitions. It also affects our conceptions of knowledge classifications and retrieval languages due to the paradox of invention and discovery.

The list made by Cronin and Meho (2009:409-413) of information scientists writing about French theorists is extensive. The examples listed by Cronin and Meho include Budd’s 2005 paper that examines work on phenomenology and determines what information studies can learn and use from that work (e.g. Husserl, Heidegger and Ricoeur), application of such ideas as intentionality and being in information studies work, and the potential for greater application of the information seeker as other. Frohmann (1994) proposes that the kind of discourse analysis practised by Michel Foucault is a useful research method in information science. The method permits analysis of the ways in which information, its uses, and its users are discursively constructed, especially in theoretical discourses, such that power over them can be exercised in specific ways.

For Hannabuss (1997), Lyotard’s work on postmodern knowledge has been influential on thinking about paradigms, meta-narratives, legitimation and contemporary trends, exploring the implications for information professionals. Radford (2003) introduces Michel Foucault’s *Archaeology of Knowledge* as a way to address tunnel vision and blindness in information science, thus providing a framework in which to understand that the discursive formation of information science itself must be analysed, how the nature of the discursive formation hampers

fertile research, and to generate a self-reflexive and critical attitude among information science scholars.

Table 3 is a summary of Cronin and Meho's (2009:409-413) list. The more detailed list is in Appendix C.

Table 3 Summary of Cronin and Meho's (2009) list of information scientists writing about theorists

Andersen and Skouvig	The theories of **Michel Foucault** and **Jürgen Habermas** provide a *sociohistorical analysis* and critique of knowledge organisation to point out how the discipline understands itself and how it is a *de facto* human activity.
Bouthillier	An *ethnographic study* designed to understand the nature and the role of public library service in a specific context. Using the theoretical frameworks of **Pierre Bourdieu** and **Anthony Giddens**, Bouthillier provides an analysis of the basic systems of meaning that service providers bring to their interaction with users.
Budd	Examines work on *phenomenology* to determine what information studies can learn and use from that work. The paper presents a literature-based conceptual analysis of pioneering work in phenomenology (including that of **Edmund Husserl, Martin Heidegger, Paul Ricoeur**), application of such ideas as intentionality and being in information studies work, and the potential for greater application of the information seeker as other.
Burnett	Communities, whether real or virtual, are mediated by interpretation. One's place within a community is constituted by an ongoing metaphoric 'reading' through which one attempt to understand what others within the community say and do. Virtual communities are unique in making such reading explicit through further acts of writing: participants form communities through public performances (writing, reading and interpreting of texts). Analysis of virtual communities must take into account both the exchange of meaning through texts and the fact of a mediating distance between participants. The *hermeneutic theories* of **Ricoeur** can support an analysis of these activities, which accounts for temporal and spatial distance in the exchange of the community's texts.
Frohmann	The kind of *discourse analysis* practiced by **Foucault** and his followers is a useful research method in library and information science. The method permits analysis of the ways in which information, its uses, and its users are discursively constructed, especially in the theoretical discourses of LIS, such that power over them can be exercised in specific ways.
Hannabuss	**Jean-Francois Lyotard**'s work on *postmodern knowledge* has been influential on our thinking of paradigms, meta-narratives, legitimation and contemporary trends in the information economy. These issues are discussed, criticisms of his work examined, and implications for information professionals explored.
Luukkonen	Discusses the lamented lack of a theory of citations and the lack of a *sociological theory* in particular. Draws attention to one proposed theory and discusses the potential reasons why it has not been generally accepted as the theory of citations, despite its merits in explaining many phenomena in the citation behaviour of scientists. This theory has been

	expounded by **Latour** and presented in his book entitled *Science in Action*.
Radford	Introduces **Foucault**'s *Archaeology of Knowledge* as a way of addressing 'tunnel vision and blind spots' (Wiegand) in the discipline of Library and Information Science (LIS). Foucault's Archaeology provides a framework in which to understand: (1) how the discursive formation of LIS is itself a problem to be analysed beside others; (2) how the nature of the discursive formation hinders potentially fruitful research in LIS; (3) how understanding Wiegand in terms of Foucault can help to generate a new *self-reflexive and critical attitude* among LIS scholars to their own *discursive formation* and that of others.
Van House and Sutton	They use *ecological theory* (biological, organisational and professional) and the *sociological theory* of **Bourdieu** to describe the radical nature of the change facing LIS education and to identify adaptive strategies.

3.3.1 The philosophical and language in information theory and practice

In establishing the philosophy-retrieval connection, certain questions come to the fore: How aware are information professionals of such efforts? What are the general opinions? How does it compare to its use in information practice? Contributions to the practical components of information science do not always state or recognise the philosophical roots that inform its theories and methodologies. Philosophical thinking is revealed through the identified schools of thought (philosophy) in information science, and reflections on what kind of science information science can be. Philosophy within information science is illuminated through the use of language and related aspects of meaning and representation, within the context of information retrieval. The place of language in information retrieval and classification illustrates the role that philosophy plays in information practice. Philosophical thinking is therefore made visible using natural language in classification and information retrieval.

The impact and influence of philosophical attitudes on the following subareas or fields of information science are the focus, namely knowledge organisation (retrieval and classification) and readership. They all have in common the communication of information and cannot 'be promoted or demoted independently; they can be distinguished but not separated' (Bekker 1978:35). The relationship between record and user changed through history as knowledge gained over time became less dependent on direct sensory experience, in tandem with the increase in access to

the indirect experience of others through verbal and written language (enabled by the ability to read). The expansion of science, and therefore of scientific knowledge, and the standardisation of writing and communication were both due to the printed work. Printed works enabled comparisons between scientific discoveries and the detection of errors or contradictions. This leads to the rise of modern science and empirical research, according to the work of Francis Bacon. Bacon developed the foundations of a new science, a science of the sciences (Coetzee 1977). This is a science intended to describe the science of reality, which is a scientific inclusive viewpoint (world view) of reality. A view of such totality demands a space for science as a *human* activity that forms part of that reality together with the 'spirit and the life of the person' (Coetzee 1977:2), not to be confused with being a history of the world and science.

3.3.2 Information spaces and the rhizome labyrinth

Contemporary approaches to the traditional library documentation often still involve organisation, classification, indexing and cataloguing of information and therefore information sources, irrespective whether physical or digital, online media types. The concept of "document" remains important, but that documents of these technologies 'can be seen as products of them, as much as the input for such' (Day 2019: loc 2649). Post-documentation technologies include social media technologies and machine learning (Day 2019: loc 193). Two examples of cybernetic systems given by Day (2019: loc 2672), are the small time scales of GPS location and the large time scales of Google search rankings, positioning us in documentary space.

The philosophy of language and its related aspects of meaning and representation are part of the context of information retrieval. At a broader level, and before an information retrieval system is devised, the universe of knowledge is structured and organised to a specific classification theory. A classification theory reflects a particular world view, and the class divisions and subdivisions used in the resultant classification system additionally reflects how language, meaning and relations are understood. Language and information retrieval is about human involvement,

implying that communication, meaning, understanding, interpretation, analysis and synthesis, all give form to the impact of the philosophy of language in the library.

The library as an informational space reveals how philosophy, and the philosophy of language, is used in practice; and how the library cannot escape systems of power and knowledge (Radford & Budd 1997:320). This holds true for all library types (physical, online, virtual and electronic) or any other information institutions involved in information retrieval and access. This includes the ad hoc library that a user creates with every search from 'that great "virtual" library that is the universe of all accessible books, all stored information' (Garrett 1991:381). The library is simultaneously 'real-world', metaphor, fiction, a framed work of art. The labyrinthine textual or documentary networks are a challenge to information workers in terms of their place in this transformed, spiritual space. The library as labyrinth is a metaphor that seems to describe such a library milieu, and as a rhizome labyrinth, it is in need of Michel Serres' troubadour or navigator of knowledge as a *rhizomatic knower* (Deleuze & Guattari 1987; Zembylas 2002) to draw together disparate images from the universe of human experience. The idea of a rhizome creates tension, as it appears to stand in direct opposition of how knowledge is organised according to classification principles. The source of the tension, however, is obscured by the view of the rhizome as an oppositional or contrasting classification approach aimed at replacing the traditional system.

Image 4 *Rhizophora* (against straight line thinking) by Kurt Brereton, 2004, acrylic and coffee on paper, 230 x 190 cm (image from Howell 2007:123)

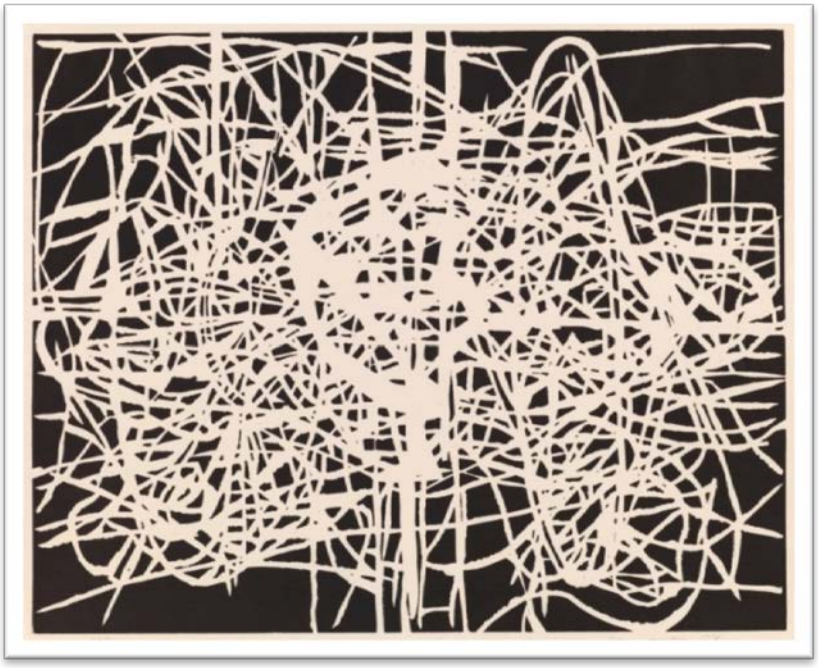


Image 5 *Rhizome* by Terry Winters, 1998, linoleum cut on paper, 48.3 x 63.2 cm (image from Smithsonian American Art Museum 2019)

Deleuze and Guattari ‘invoke one dualism only in order to challenge another [and] employ a dualism of models only in order to arrive at a process that challenges all models’ (1987:22). The rhizome, which grows and spreads through multiple nodes underground, is proposed by Deleuze and Guattari as a theory of knowledge that provides for multiple, non-hierarchical entry and exit points. The theory favours connectivity, heterogeneity and multiplicity. It is a mapping rather than a tracing of knowledge. It works with planes and interconnected and tangled lines rather than through vertical and hierarchical lines, as does the “arborescent”:

> A rhizome has no beginning or end; it is always in the middle, between things, interbeing, *intermezzo* (Deleuze & Guattari 1987:27).

The rhizome is therefore a centreless network where every node connects with every other in a subterranean and horizontal fashion, allowing multiple, and non-hierarchical entry points. Figure 13 represents the six principles of the rhizome, as identified by Deleuze and Guattari (1987):

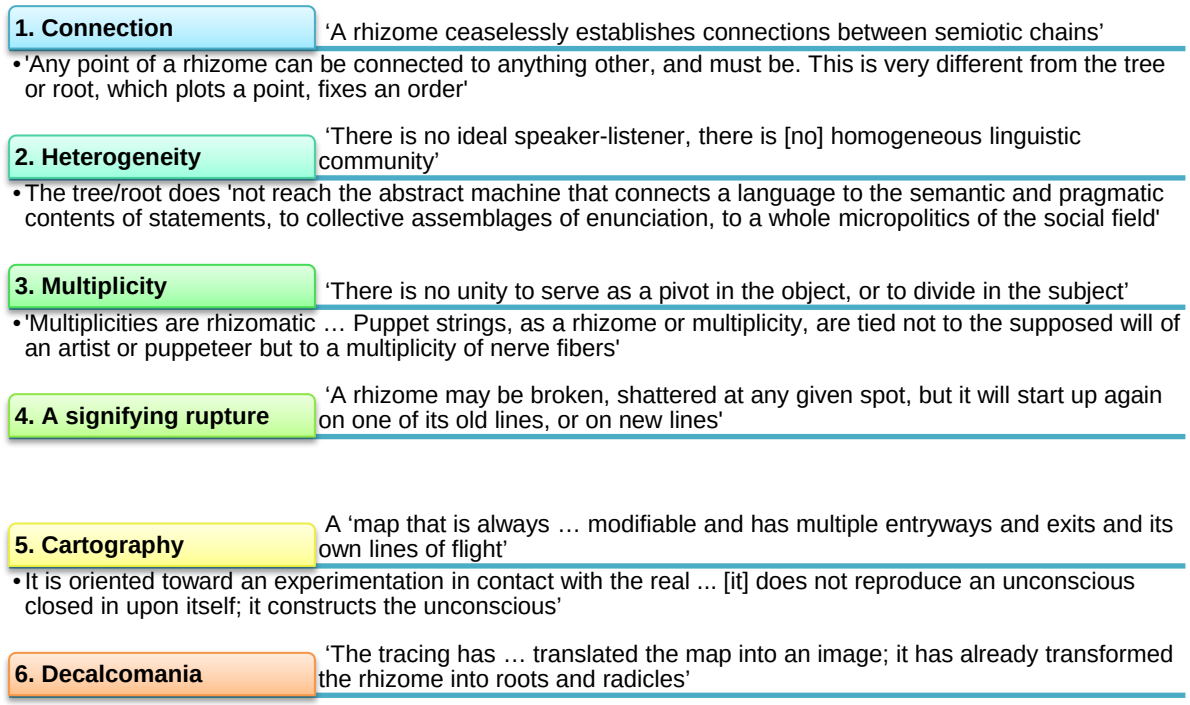


Figure 13 The six principles of the rhizome (unlike the tree) (based on Deleuze and Guattari 1987:6-13, 22)

The rhizome labyrinth is the *nature* of the “unseen” library that lies under and behind the visible structures and systems of the library as a formal, controlled information institution. The library as labyrinth (Garrett 1991:380) suggests perhaps another character, that of Ariadne. Ariadne’s thread implies a unicursal labyrinth, which leads the seeker to a specific position, the centre where the Minotaur is, by way of possible routes depending on the particular method used to trace steps or points in a search. Ariadne’s thread is the record created and maintained, whether in a physical or mental medium, of the process and the options/possibilities and problems encountered. This kind of record keeping allows reversal and revisiting of previous decisions/paths taken and considering alternatives. The labyrinth type that is more suitable for the library milieu in this study is a multicursal, or as already indicated, a *rhizome labyrinth*. The latter is a maze of overlapping paths with shifting boundaries. The rhizome most closely resembles contemporary users’ information seeking behaviour (Garrett 1991:380). Ariadne will, therefore, be unable to assure definite success in every search undertaken and may become as lost as we are by becoming the labyrinth herself.

Not only was Ariadne the half-sister of the Minotaur, but also co-responsible for his death, thus carrying a ‘multiplicity of very specific, interrelated associations … [of] imagery and ritual’ (Florman 2000:188-190). Picasso’s *Minotauromachy* (Image 6), according to Florman (2000:239), associates diverse components around common points of reference, with several actions taking place within a confined space filled with symbolic content (MoMA 2020).

Image 6 *Minotauromachy* (La Minotauromachie) by Pablo Picasso 1935, etching and engraving, 57.4 x 74.2 cm (sheet), object number: 20.1947 (image from MoMA 2020)[11]

Perhaps contemporary library users can take Ariadne's light instead (but without the anchor or point of reference provided by the thread) to

> explore on their own the many recesses of a multicursal maze, placing them … in decision situations, at forks or nodes where multiple paths lead down through the hierarchies of subject headings, on their way to what may or may not be a useful or even existing document (Garrett 1991:381).

[11]The main protagonists are a young girl (Ariadne) with a candle and a bouquet of flowers, and a Minotaur (mythological creature with human body and a bull's head, bull-man). The sailboat on the horizon (MoMA 2020) may reference Theseus who sailed off, leaving Ariadne behind.

Thus, they become travellers like Serres' navigator of knowledge, Hermes. The modern library user as navigator would be able to benefit from the exchange between the object of the library and the translation of its knowledge concepts. The rhizome maze can be compared to a mode of thinking external to information science, namely that of Bernard Tschumi's (1998) point-grid, which brings together concepts or ideas that cannot be merged (disjunction), but through the point-grid disparate ideas are brought together to create new connections and knowledge. It can also be compared to a mode of thinking from within information science, namely Gernot Wersig's (1992) weaverbird perspective (knowledge for action).

Making use of the library in its metaphorical sense may seem "unreal," but imagination allows for inventive and creative ways of revealing the invisible substrates (Bates 1999) and philosophical roots of information science, which prides itself on its practicalities and dominant focus on application. It also allows for mediating between or bringing together conflicting understandings and interpretations, in a manner similar to Ricoeur to reach deeper levels of insight (Michell 1981:95). The rhizome is contrasted by Deleuze and Guattari (1987) to its seeming opposite, namely the binary, vertical, linear and hierarchical model of knowledge represented by the tree (tree of life, tree of knowledge). The rhizome, in contrast,

> ceaselessly establishes connections between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles (Deleuze & Guattari 1987:7).

The document or record cannot inform or communicate its content if the user lacks a certain level of literacy, even more so due to the impact of vast computerisation of information. Svenonius (in Benoit 2005:163) stated that 'epistemological foundations of knowledge representations [are] embodied in retrieval languages.'

Robinson and Maguire (2010) use Deleuze and Guattari's rhizome or nomad metaphor, as contrasted to the tree metaphor system, in the context of classification and thus to information organisation (Figure 14). The rhizome concept is used in the

metaphorical sense as image of thought for the nature of information and knowledge, offering and allowing

> non-hierarchical linkages, made pragmatically as they are needed, horizontally or across any number of levels, and linking elements of disparate nature when appropriate, crossing categories. It presents a decentred network … allowing immediate connections between any of its points (Robinson & Maguire 2010:606).

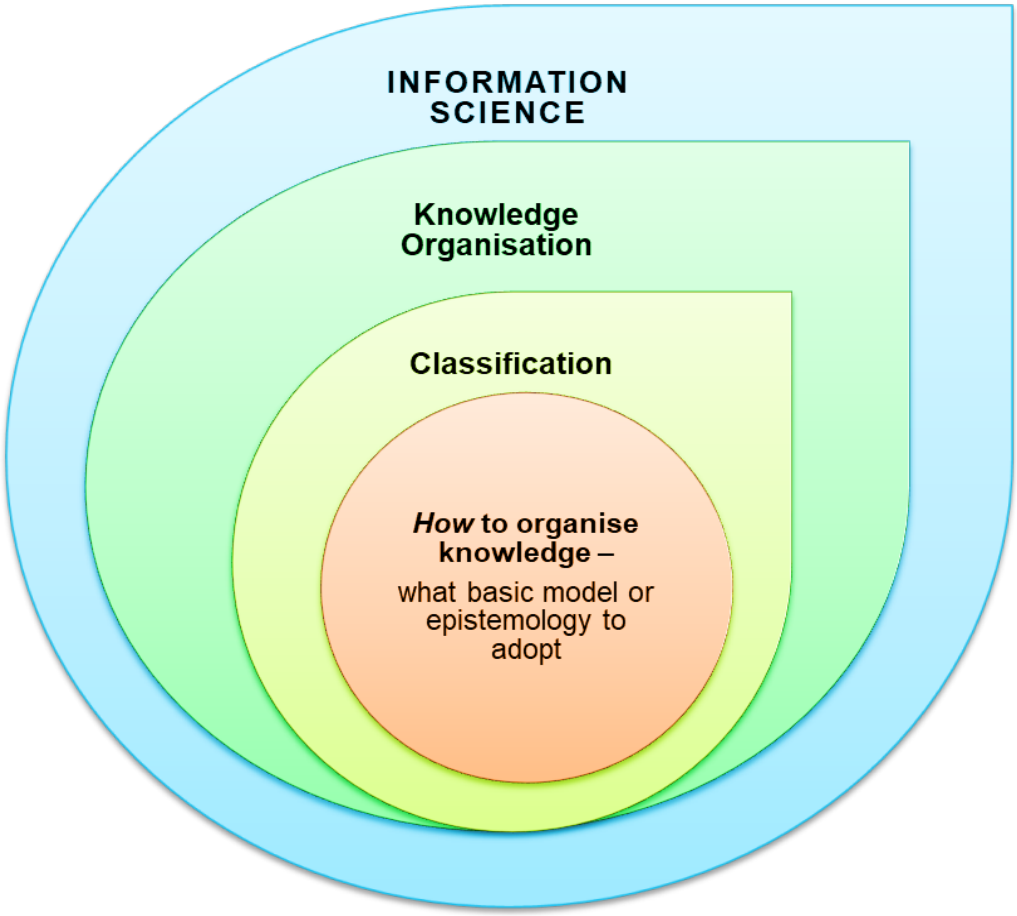


Figure 14 At the heart of information science (based on Robinson & Maguire 2010:604)

3.4 Pathway 3: External philosophy connections to information and information science

The role of philosophy in information science offers a unique opportunity to reconsider its interdisciplinary status as it stands in the contemporary scholarly and societal environment. This involves how its historical development contributed to the underlying philosophies of information science. It also serves as a reminder that the concepts of information and knowledge remain of central concern not only in information science, but also in many other disciplines. How the terms are conceptualised influences perspectives in a chosen area of inquiry.

3.4.1 Information, knowledge and wonder

Morin (1983) deals with social paradigms of scientific knowledge, and its importance for the practice of science in returning the subject to knowledge and each individual's search for knowledge. The sources that determine knowledge are individuals themselves, bio-anthropological, noological (e.g. linguistic, logical), sociocultural and psychoanalytic. These determinative inputs jointly influence every field of knowledge, investigation and thought in science. The need for self-examination, reflection and self-implication is essential in knowledge, but can be blinded by the obedience to fact. Thinking is necessary for knowledge-guidance, but removing the subject eliminates thinking. Method becomes a technical action instead of a problem-statement in investigating the truth. Researchers have a personal relation to their ideas, which influence the selection and arrangement of facts. This subjectivity of the individual's ideas relates to a bio-anthropological view of the mind as a *neuro-cerebral apparatus* (Morin 1983:4). The personal psychoanalysis links to a collective archetype, which moves amongst and between anthropological, sociocultural and personal aspects, which together forms part of an ethno-social group. Science is not limited to pure objective fact and cannot escape the problem of the complex cultural, social, historical conditions of knowledge. It is composed of theoretical systems and needs languages, ideas, logic and noo-organisation. Sociology of knowledge becomes an important part of epistemology. In the analysis of the subject, more than

its existential subjectivity is recognised. It is transformed in a re-objectification inside a sociocultural reality (Morin 1983).

The notion of information based on the dominance of simplification, whether taken as a measurable entity or as a replacement of mind and idea in shaping matter and manipulating energy to explain everything, must be contested and resisted (Morin 1992). Complexity remains excluded in this kind of *informationist information* slope of simplification and manipulation, because information is enclosed

> on itself in order to make it a closed, primary, terminal notion ... as a supreme concept [instead of information] as bonded concept (Morin 1992:367-368).

Information cannot be isolated from the observer/conceiver, because no matter its many transformations, it exists only inside the anthropo-social sphere (Morin 1992) of life. The complexity of the organisation of life entails uncertainty, confusion, chaos, and obscure and multiple, always open ideas. The concept of information is *complex* information and not dualistic or oppositional information. The two bases of complex information are the physical (*physis*) base of the object and the psychic base of the subject (anthropos), with exchanges between them allowing translation and transformation. The two bases are reflected in the multiple entries of information, namely physical (foundation, organisation), biological (origin, communication) and anthropo-sociological (development and diversification (culture, ideas, language, society)) (Morin 1992:369-370). Information is a nonlinear, simultaneous part of these multiple entries:

> It is then and only then that the concept of information can spread its wings, and, from entropy to *anthropos*, from object to subject, traverse the universe, not to subjugate it but to survey the mystery in it (emphasis in original) (Morin 1992:370).

Complex knowledge as a mode of knowing and thinking, shares the principle of complexity as a mode of acting, with complex information. Complex knowledge does not manipulate, simplify or mutilate thinking and the principle of action required does

not order, repress, direct or manipulate the real. It organises, weaves together, communicates and animates (Morin 1992:397). The knower, or knowing subject, is not excluded from the communication loop of knowledge that transforms the subject through its own transformation:

> Complexity is a progress of knowledge … which brings the unknown and the mysterious. Mystery is not only privative; it liberates us of all delirious rationalization which claims to reduce the real to the idea, and it brings us, in the form of poetry, the message of the inconceivable (Morin 1992:393).

> [T]he “complexus” term in the sense of “what is woven together” … is a very important word, which indicates that the breaking up of knowledge prevents from linking and contextualizing (Morin 2006:14).

Polanyi’s (1964) concept of tacit knowledge aims to combine oppositional approach to the objective-subjective distinction, a conception of science based on the disconnection or disjunction of subjectivity and objectivity. ‘Personal knowledge - towards a post-critical philosophy’ (1964): objectivism/positivism rejects intuition as a way to gain knowledge, asserting unverifiable sentences as meaningless. Discovery, or discovering the nature of external reality, considered by Polanyi to be the most significant part of successful scientific inquiry, is not likely within a conception of science based primarily on verifiable evidence:

> Theories of scientific method which try to explain the establishment of scientific truth by any purely objective formal procedure are doomed to failure (Polanyi 1964:135).

Personal, tacit knowledge as cognitive processes guides the pursuit of discovery ‘by sensing the presence of a hidden reality toward which our clues are pointing’ (Polanyi 1966:23), resulting in conscious belief. Polanyi states that indwelling ‘is a

participation … in the existence of that which we comprehend; it is 'Heidegger's *being-in-the-world*'[12] (emphasis in original) (Polanyi 1964:x).

The world and its parts as explained by scientists may necessarily differ from the world we describe ourselves. An individual is inseparable from his or her own subjectivity, which includes a socio-cultural and a personal dimension (Morin 1983:3-5), taking into account the everyday of 'the world of real life' or 'the world of common sense' (Ryle 1976:68). Phenomena cannot be understood as either objective or subjective events. Phenomena are a bit of both without separating the observer from the objective reality. The observed (or inquired-into) is altered by the observer through the act of observation (Talbot 1993). We participate within a spectrum of many realities and the consciousness of the observer or participant does affect the outcome of the inquiry (Capra 1982:38). Objectivity is a method *chosen* to inquire and not what characterises the inquirer. The connection between assumptions and the research effort must not be lost. Methods as well as the orientation of the observer together generate valid knowledge.

3.4.2 Concepts and multidimensional disciplinary contexts

Cooper (1987) analysed the concepts of information, communication and organisation according to their differences. These terms are central to modern systems theory, and the meaning of information for systems theory is one of a commodity that serves the needs of the system and the user when exchanged. However, the meaning, relevance and functional value of information for the system became problematic. Post-structuralist thought lead to a total revision of the system-centred approach to human discourse. This system is displaced by two views, the first conceptualises language as a process, which organises information and communication, but instead of language being a functional, passive vehicle for human interaction, it now actively originates and structures human experiences. The second view characterises language as a structure of marks or sounds on which meaning has to be imposed (Cooper 1987:395-396). The implications of these

[12] Heidegger (1996) posited the idea that thinking allows people to find their way in a complex world, to make it habitable and develop it into a dwelling, in his 1953 book *Sein und Zeit* [Being and time].

conceptual displacements for what is understood by information, and communication and organisation, as well as information technology developments, necessitated an in-depth look into the nature of information.

Assumptions may seem to be philosophical in nature whether those of dominant approaches found in library practice, or how decision-making determines the manner in which a library functions. Some information scientists may simply be unconcerned whether philosophy is present in their work or not, perhaps because their main goal is more about getting results (thus about the how and not the why). This could be described as a neutral position. If the assumptions implicit in traditional approaches remain hidden, the possibility of surprise in social processes and in science is suppressed. Such hidden assumptions cannot be evaluated or addressed, making it difficult to address the glossing over of complexities intrinsic to social processes and the value of differentiation. Differentiation is not the same as exclusion, for example, information and division as a binary structure separates and joins simultaneously (Cooper 1987:397-398). Cooper further explains the essence of difference as self-interference, which is the process in which terms contain their opposites, denying a singular understanding of their meaning. Social organisation is motivated by a need to suppress self-reference by creating social objects and objectives.

Significant in Cooper's (1987) contribution is noting that what much of the discourse around information identified the presence of an implicit assumption in the traditional approaches. This assumption is the acceptance of an original source that provides order to the processing and understanding of information. Such a legitimised system favours unity, simplicity and above all, communicability, thus organising the world as a reflection of the system itself. This affects how information is defined if we compare it to other definitions of information. Information theory defines information as a probability, or 'that which is least likely gives the most information' (Cooper 1987:396). Probability assumes, similar to the repetition in systems theory, that there is an existing order ensuring that the *already-known* will recur. Probability and repetition protects the system against the unknown, thus excluding any possibilities of surprises and the unknown. Unpredictable and non-probabilistic information (insights), though, presents a challenge to a system that can only deal with rational and instrumental knowledge:

> Surprise as the deconstruction of a familiar order can only emerge if there exists an attitude which permits a degree of distantiation from the routinising or normalising operations of the system (Cooper 1987:397).

As long as the sciences structure their language and concepts as the material expression of information in order to normalise and conform, combined with the desire to master the uncertainty aspects of information, surprise will remain suppressed and society homogenised further. A model that is even more efficient in suppressing surprise and smoothing out paradoxes and contradictions is the cybernetic model of performativity. This has serious implications for information science, because information in such a system is programmed, not communicated (Cooper 1987:397-398). Cooper offers a model of information that goes beyond the views of information as useful knowledge and information as a simple binary structure, and that seems to have the right kind of attitude present.

Information, as the alternation of a whole between two terms, recognises its true nature as interactional. This is the process where form is forced out of non-form; the form is that which is fixed, framed and certain; *non-form* is uncertain, infinite, informed. This form/non-form relationship is dealt with very differently in information theory, which gives preference to form and treats uncertainty as ignorance. Philosophy and psychoanalysis are identified as traditions that still recognises information as the source of surprise (Cooper 1987), emphasising the importance of ideas external to the discipline in conceptualising information formally as a dynamic relationship that takes human action into consideration.

Lash's (2002) *critique of information* approaches information within the context of the technological culture of the global information order, and what the future is for critical theory in an era allowing very little time for reflection. Lash (2002) explains what information is by means of a discussion of preferring the name *information* society, rather than postmodern or late-modern society. It is significant that information allows for the experience of both order and disorder, for the reason that disorder or chaos is an unintended consequence of rationality or order. The qualities of

information include flow, real-time relations, spatial and temporal compression; these reflect the state of irrational information overload, disinformation and out-of-control information in which the information society finds itself. The implication is that information is now outside a systematic conceptual framework, which is required by philosophical discourse, leaving very little time for reflection. The "*informationcritique*", based on movement and flows, is simultaneously an information order and a disordering (Lash 2002:2-5).

Althusser (1990), a philosopher, is very explicit about how philosophical insights feature in science and offers insight into the relationship between philosophy and other disciplines. In this case, it can be applied to information science, similar to the application in mathematics

> being neither a tool nor an instrument, nor a method, nor a language at the service of the sciences, but an *active participant* in the existence of the sciences, in their constitution (emphasis in original) (Althusser 1990:87).

We could claim that the relationship between philosophy and information science is that philosophy actively participates in the existence of information science. Constitution instead of application is used to open up space for new questions to be posed to enable the questioning of old answers and even older questions. Thus new or different views on things as opened up. This is crucial to information science in determining its path ahead as it follows, breaks away or reconsiders what went before.

The use of the word 'interdisciplinary' in the human and social sciences often seems to be employed indistinguishable from the word 'intervention'. The intervention of one science in the practice of another science does not mean that there exists an interdisciplinary relationship or interaction. The interventions represent new relations from which new disciplines are born, for example biophysics. These were not deliberate attempts, but rather results due to developments *within* classical disciplines of new branches. Althusser (1990) refers to these exchanges as organic relations established by observing purely scientific requirements within the sciences

involved, and therefore without external philosophical intervention. There were no deliberations prior to their formation and such new relations/disciplines are not interdisciplinary sciences in any way:

> *these relations do not constitute what contemporary ideology calls interdisciplinary exchanges* (italics in original) (Althusser 1990:87).

They are new branches of classical sciences or new sciences, but not "interdisciplinary" sciences. Demarcating interdisciplinary belief systems from active reality, which is the mutual application and constitution of sciences, have certain implications. At a theoretical level philosophical questions are exposed, for example what is technology, what the application of one science to another is, why it is necessary to initially speak of constitution rather than application, what concrete dialectic at work is in these complex relations. According to Althusser (1990), such philosophical questions may open the way to scientific problems. The latter includes the history of the sciences, or conditions of the processes of constitution of the sciences. At a practical level, the demarcation has real effects, namely 'avoiding conceptions, tendencies or temptations which might lead to unthinking 'interdisciplinary' collaboration, and encouraging every productive practice' (Althusser 1990:88). Another aspect regarding science that concerns information science is the accepted "obviousnesses" of false ideas not only philosophers, but also scientists themselves hold about science. These false ideas are epistemological obstacles to progress as they offer fictional solutions, effectively obscuring real problems.

Many disciplines seem to be on the borderline rather than interdisciplinary. Thus, if the relation between the human sciences and the natural sciences is more external or non-organic than between the exact sciences (organic) themselves, then the relation is not truly interdisciplinary. The latter is then an illusory name (Althusser 1990:90). Perhaps one might consider rather using the term 'interdisciplinary' regarding relations among disciplines in the human sciences. Alternatively, the term "interdisciplinary" might be used to establish the relation between human science disciplines linked using *certain philosophies*. Althusser (1990) refers to the intervention of philosophy as a third character. Whereas the intervention of this

character is not visible in the exact or natural sciences, the ‘structure of relations between the sciences and the human sciences seems to require … the intrusive intervention of this third character that is philosophy: in person’ (Althusser 1990:90-91).

3.5 Summary

The hypothesis addressed in chapter 3 was that philosophical assumptions and viewpoints influence perceptions of and approaches to information science interests, including information professionals and their knowledge, actions and understanding. In the next chapter, the information science field of retrieval is used to show how approaches to language in information retrieval reveal the kind of relationship information science and philosophy has. It adds to the main hypothesis is that, in constituting information science as a particular kind of science, its theories are connected to the philosophical foundations of those theories within the setting of the philosophical through language.

CHAPTER FOUR

INFORMATION PRACTICE AND PHILOSOPHY: INFORMATION RETRIEVAL

Let the use of words teach you their meaning (Wittgenstein 1986:220).[13] *[W]e discover what philosophy is* by practicing it*. There is no other way... philosophy is above all* practical (Althusser 1990:83).

4.1 Introduction: Information organisation and retrieval

The aim of this chapter is to address the question of whether the actual, perceived or potential role of philosophy in information science is large enough to justify its recognition. This is done by illustrating the role of philosophy with information retrieval as an example of information practice influenced by philosophy and that cannot do without the philosophical. The justification for the role of philosophy therefore includes the close ties between information retrieval and language as part of the answer. The objective is to reveal the role of philosophy and the philosophical through the work of David Blair, Peter Ingwersen and Fanie de Beer.

The discussion of each author does not include their entire body of work, but of selected publications. The contribution of David Blair on information retrieval (IR) with his emphasis on a specific philosopher, namely Wittgenstein, is used by focusing on his interpretation of Wittgenstein's later philosophy of language (natural language) for information retrieval. The contribution made Peter Ingwersen in the context of information retrieval (IR) is employed to illustrate the way philosophy is utilised in information practice, namely his cognitive approach to information retrieval and language. The contribution of Fanie de Beer on readership, specifically the inventive act of reading and knowledge organisation, is employed in the context of

[13] Also stated as 'the meaning of a word is its use in the language' (Wittgenstein 1986:20). Blair (2005) cites Ludwig Wittgenstein to show how the use of a word is more helpful in understanding its meaning than a definition.

language to understand the role it plays and its implementation in knowledge representation efforts towards enabling information retrieval practices. The section on Ingwersen is longer than the section about Blair and De Beer, but the main reason for this is that Ingwersen serves as the connection, in the sense that both Blair and De Beer explicitly apply the work and ideas of philosophers to concerns of information science.

The connecting line between philosophy, information science and language is drawn through the concepts of meaning, expression, communication and transference. In Lecercle's *Remainder of language*, life expression and the manner or ways of *reading and thinking* are of relevance. Language philosophy approaches in information science domains or subfields are especially noticeable in literature studies, user studies and readership. Language includes the concepts of communication, meaning, understanding, interpretation, and analysis and synthesis; thus linking language and philosophical thought to information and *multiple connective intellection*.

Providing access to the intellectual content of information sources is a core element in information retrieval, making it essential to understand how language expressions impact retrieval efforts. Without language, there are no frameworks, methods or understanding. Language represents meaning through language constructs without which information scientists cannot begin to understand its users and communities. The library, for example, cannot escape the systems of power and knowledge, as described by Foucault (Radford & Budd 1997:320). The role of philosophy in information science is illustrated in the relationship between language and information. The relationship is most visible in information science practice where language (meaning, understanding and representation) is integral to retrieval (user, reader, object, vocabulary) and classification (organisation, order, content guide). The inputs of philosophy enable information scientists to reflect on language and information; philosophy of language enables the frameworks and methods to understand (meaning and language constructs) the user.

How philosophy manifests in information science offers an opportunity to reconsider the discipline's interdisciplinary nature as it stands in the existing scholarly and

societal environment, as well as how its historical development contributed to the underlying assumptions and philosophies that are present in the discipline and its domains. Even though philosophy and philosophical thought seems pervasive in information science theory and practice (its nature and application as a subject field), it is not always recognised or accepted. The problem with not recognising or ignoring philosophical approaches, is that the benefits of philosophical thought cannot be utilised in understanding how knowledge, information and its communication are manifested through language and language expression (for example, the contribution of the philosophy of language to the success in information practice). Information retrieval (including information storage), still considered as one of the main areas of information science (Summers *et al* 1999:1157), is the context in which language, philosophy and information are discussed. The philosophy of language offers insight into how and why philosophical approaches and developments in the various sciences (with their own philosophical attitudes) have made such crucial contributions to information science. Information seeking and retrieval relate to information in its organisation and retrieval tools. The importance of information retrieval (IR) for information science lies in human-computer interaction (Benoit 2005:164), and how such interaction relates to information ethics.

Language connects the concerns around which formal information processes typically revolve namely the record and the user. The special relationship between the user and the record (and the written word), or interrelationship, is a concern that links the areas of record studies and user studies (also referred to as information user studies or information user behaviour). Record studies and user studies, for example, are affected by how the relationship between information science and philosophy are approached and conceptualised by information scientists. The shift from a record-oriented to a user-oriented accent in the discipline, for example, moved the focus to the communication or provision of information, irrespective of the medium or process (Bekker 1978:34). In many current information science curricula record studies, user studies and readership have been integrated into one field of research under the name “user studies” or increasingly as “information user behaviour”.

Readership is the study of the reader and user of books and information, including the action of use by the user of an information institution such as the library. Readership includes the human abilities of language, reading and understanding. It is the interaction between a record and the user (informed by the record) connecting record studies to readership (Bekker 1978:40-43). The emphasis on the object of study in record studies, the record, is more on its intellectual content than its physicality or material attributes. The record, therefore, is usually treated in its broader sense by those in the information profession,

> primarily as a bearer of ideas, as a container of information, and … this information should be made optimally available for the benefit of [hu]mankind (Bekker 1978:43).

The focus on the individual user does not preclude the wider social environment external to the library as information space. The cultural situation and position of the user seeking information is brought into the search process that takes place in an already existing information system. According to Wikgren (2005), the information science researcher is responsible for knowing how the process of seeking information is affected by social mechanisms at empirical and observational levels. Observation entails the user as individual and as member of a community (human action), as well as what the underlying causes and relations might be (Wikgren 2005:19).

The retrieval of information is dependent upon information having been organised. The building blocks in the organisation of recorded information are retrieval tools. These tools provide access to retrieval systems, which contain records as surrogates for the entities they represent. Examples are bibliographies (pathfinders), catalogues, indexes, finding aids, registers, search engines and directories. The classification system applied as part of the narrow approach in information science is grounded in the theory of such a system, placing classification theory within the broad approach of information science. Kochen's (1983b) description of the narrow and broad approaches is visible in references made by Bates and Borko to information science as meta-scientific in nature. Bates (1999) refers to the narrow

(practice) approach as the above-the-waterline substrate, and to the broad (theory) approach as the under-the-waterline (invisible) substrate of information science.

Peter Ingwersen and David Blair are two representative proponents of philosophy and the philosophical in information science. The work of Ingwersen is selected to illustrate the application of philosophical thought to his conceptualisation of information science generally and information retrieval specifically; and Blair for his contribution regarding language and philosophy as applied to information retrieval. The chapter concludes with Fanie de Beer's work on the inventive act of reading and knowledge organisation.

4.2 Information Retrieval and Wittgenstein's later philosophy of language: David Blair

> *Language does not exist by itself in a static system of definitions and syntax, but is intimately caught up in our activities and practices, what Wittgenstein called our "forms of life"* (Blair 2006:8).

David Blair, who passed away in 2011, was an empirical researcher[14] who dedicated himself to developed information retrieval theory encompassing philosophy of language, creating a strong base for information retrieval research. Blair (2003, 2005) raised the question of the importance of language and meaning for information retrieval from the perspective of Wittgenstein's philosophy of language. Philosophy of language is mainly concerned with how language works or how we mean what we say; it also does not draw sharp distinctions between understanding, language and cognition. The value of philosophy of information for information retrieval is in the examination of issues of meaning. Blair (2005:1-2) prefers Wittgenstein's later philosophy of language to investigate information retrieval systems. Wittgenstein's earlier work reflects the factual, analytical philosophy and rigorous scientific method of Frege and Russell. He supported their view that a logical language was desirable and that language had to be made more precise by using formal logic. In

[14] David C Blair was a Professor of Computer Information Systems, University of Michigan.

Wittgenstein's later, more mature work, he started to doubt the ability of logic to represent the more complex and subtle statements in language. He came to believe that ordinary language is a more appropriate medium for linguistic expression, including philosophical ones; and realised that the unclarities of language were a result of the logical approach to language aimed at removing statements from context, practices and circumstances (Blair 2005:2).

Wittgenstein also found that the meaning of a statement is determined by how it was used and in which circumstances, rather than by an underlying logic. The shift in Wittgenstein's view of language is, according to Blair (2005:2-3), important in studying information systems. The current information system has a computer model that enables precise access to the determinate content of databases, but there is a growing need for access to less determinate information, that is the intellectual content or subject matter. This kind of access requires a system sensitive to the subtleties of language. Views of interest to information retrieval is language as the vehicle of thought and that the 'context of usage is essential for understanding language' (Blair 2005:4).

Linking philosophy and language to information retrieval is not so far-fetched. Blair (2006:3) indicates that the philosophy of language is centrally concerned with 'how we *mean* what we say' and how language works, and that it does not draw sharp distinctions or boundaries between understanding language and cognition. Understanding language is closely linked to how we understand things in general and this idea can be found in De Beer (2007a) on philosophy as an act of thinking. The diversity and potentiality of human language is revealed through the fact that 'language is inventive despite the objective limits and codes which govern it' (De Beer 2007a:180), and that it is the philosopher's responsibility to preserve the variety of ways of using language, and the use of ordinary language to mediate between poetry and scientific language.

How does language, understanding and meaning impact on providing access to the intellectual content (less determinate information) of information? How can information retrieval benefit from Wittgenstein's approach to natural language in the context of the complexity and subtleties of language expressions? (Blair 2005). Blair

(2006:4-5) focuses on the later work of Wittgenstein on ordinary language as the better medium for linguistic expression (as opposed to a logically perfect language). What is deemed to fall outside the boundaries of information science, such as the philosophy of language, is central to the discipline. Disciplines in general cannot afford to ignore what lies beyond its boundaries - often what is perceived as 'outside' may have already been permeating its borders or boundaries. Especially cognitive psychology and cognitive science had a strong influence on how we understood human processing, and storage and retrieval of information, for example memory, perception, problem-solving and decision-making. The cognitive approaches had a strong positivist nature, focussing mainly on empirical generalisations. Neisser (in Roediger 1990:403) states the following regarding experimental psychology:

> the results of a hundred years of the psychological study of memory are somewhat discouraging. We have established firm empirical generalizations, but most of them are so obvious that every ten-year-old knows them anyway. … If the psychology of memory must rest its case on accomplishments like these, it has little to boast of.

Besides cognition connecting philosophy and language to information retrieval, it also involves the representation, meaning and understanding of the intellectual content of information. An ideal information system should give 'satisfactory access to less determinate information such as intellectual content' (Blair 2006:8). This makes language central in that it is a broad and deep topic permeating our lives. This needs to be understood when considering the very human user/ searcher/ inquirer who brings with them cognitive, social and cultural dimensions when making use of information retrieval systems. Moreover, the user is as human as those who create, manage and oversee those systems. Such systems need to be sensitive to the 'subtleties of language that are required for highly specific access to intellectual content' (Blair 2006:7). The precision of representation has a strong influence on its success.

Understanding how language is actually used is important if we want to understand how requests for, and descriptions of, information work. This is an issue of language, meaning and understanding. Requests for information fit properly with the study of

language and meaning because whether we request information or describe information 'we must *mean* something by these statements' (Blair 2006:3). What we mean is clarified by the context, activities, and practices in which language is used. Language is not static and does not exist in isolation from our activities. Language is not simply consisting of meanings; it almost demands to be put to use or into action, especially as *inter*actions. The language we are interested in here is the language that is characteristic of humans and a reflection of our reality, and our thoughts as knowledge about that world (Blair 2006:7-8). The provision of access to the intellectual content of information sources is a constant challenge and goal for information institutions such as the library. The information retrieval systems employed for this purpose cannot function successfully without considering language. This includes an understanding of how language works, how it is used, meaning attached to concepts; as well as deciding whether to use controlled vocabulary or natural (ordinary) language for the search strategies. How philosophy manifests itself in information science, therefore, involves language.

The relevance of Wittgenstein's late philosophy of language to understand problems inherent in information systems that rely on *retrieval*, based on *representation* of the intellectual content of that information, is that the nature of *meaning* resists concise or comprehensive explanation (Blair 2006:1).

Table 4 Wittgenstein, language and information (based on Blair 2006)

PART I	**Why philosophy, language, Wittgenstein's landscape**
PART II	**Wittgenstein's philosophy of language and mind:** Language and thought, language games, categories, forms of life, language and metaphor, instinctive behaviour, cognition (mind and reality)
PART III	**Wittgenstein, language and information:** Central message (retrieval and information systems); philosophy of mind (robotics, scaffolding), boundaries of mind, determinacy of representation, description and discrimination, consequences of indeterminacy, information systems (meaning of a document, diseases of thinking)

The nature of language as part of what it is to be *human*, carries with it innumerable links to cognitive, social and cultural dimensions, because of having 'meaning only in

the stream of life' (Blair 2006:2), thus linking Wittgenstein's intellectual landscape to information retrieval through philosophy and language as the central message (Part III in Table 5). The importance of language and meaning to the study of information systems includes (Blair 2006:3):

- information systems – tools used to search for various kinds of information
- information searches require the searcher to ask for or *describe* the information wanted and to *match* those descriptions with the descriptions of information available = thus, when asking or describing information, we must *mean* something by these statements, placing the requests for information as properly *within the study of language and meaning*
- requests can be clear or ambiguous, precise or imprecise, similar to statements in *natural language* = thus, *understanding* how requests for, and descriptions of, information work and can go wrong, is an issue of *language, meaning and understanding* (similar to that of natural language)
- Understanding is important for information systems as the *scaffolding* of our thoughts

The main or central concern of the philosophy of language is with *how* we *mean* what we say and how language actually *works*. There is no sharp distinction between understanding language and cognition, therefore the central concern is 'the problem of meaning in language' (Blair 2006:3). It is this *problem of meaning in language* that links philosophy and language to information retrieval, including the relationship between language and the world, factual assertions and truth (Figure 15).

> One cannot guess how a word functions. One has to *look at* its use and learn from that.
> …

Let the use *teach* you the meaning (emphasis in original) (Wittgenstein 1986:109, 212).

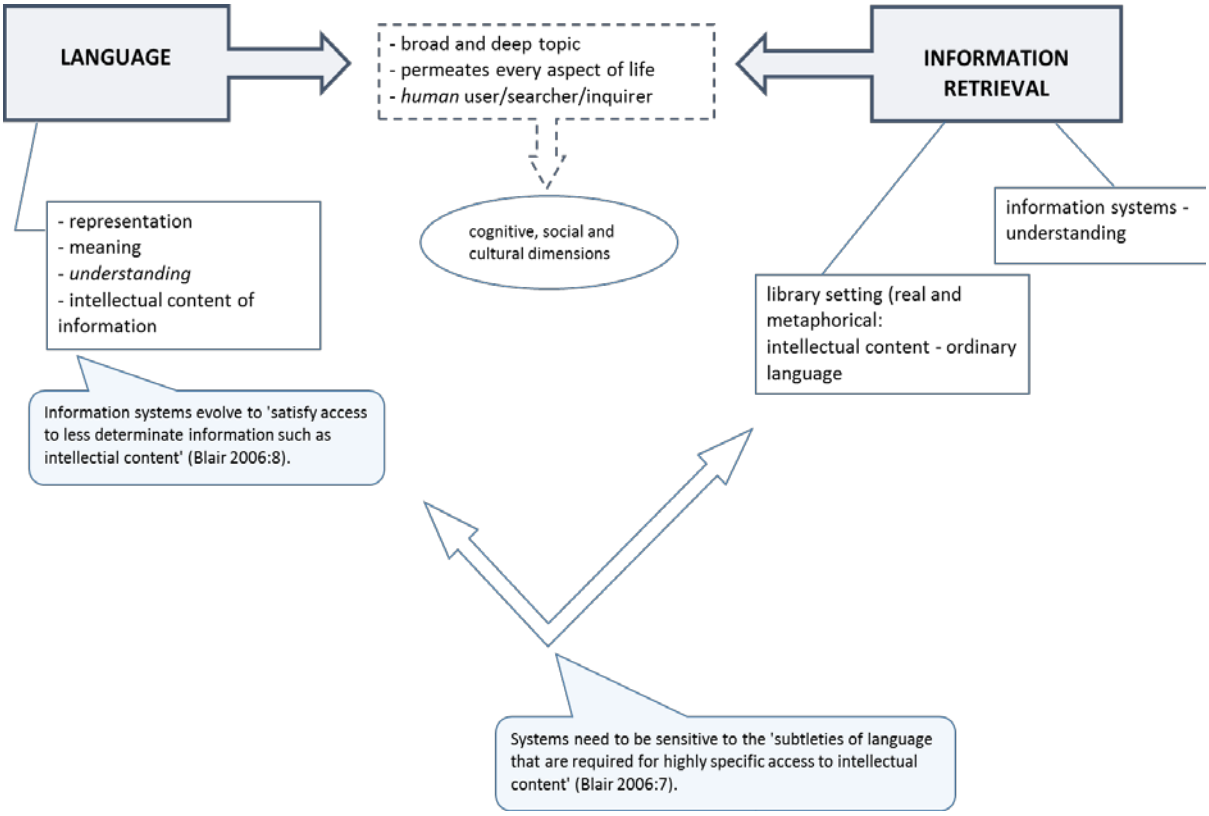


Figure 15 The problem of meaning in language and information retrieval (based on Blair 2006)

The reason for giving preference to the later, mature philosophy of language of Wittgenstein involves his misgivings about the ability of logic to model or represent the complex and subtle statements of language, and the realisation that ordinary language (how words are used and circumstances used in), if used properly, was the best medium for linguistic expression. This was a dramatic shift from approaching language as an immovable, imposed structure (Wittgenstein 1974[15]), to a view of language as a more fluctuating form intertwined with everyday practices and forms of life (Wittgenstein 1986[16]). Wittgenstein thus moved away from his earlier belief that problems of meaning in language could be clarified by logically analytical methods, towards understanding that many “unclarities” of language resulted from statements

[15] First published 1921.

[16] First published 1953.

being removed from context, practices and circumstances in which they were commonly used, namely the *forms of life* (Blair 2006:5). This transition in his view on the nature of language is important to the study of information systems, especially for the computer model (logical model) and data model of information. The reason for this is that the context that makes information more meaningful is given by documents and the actual use of language,

> for it's not an underlying logic that clarifies what we mean, it's the context, activities and practices in which we use language that provide the fundamental clarification of meaning we are looking for.
> …
> And, like language, there is no underlying logical model of information that we need to uncover (Blair 2006:6-7).

One of the key aspects is the use by Blair (2006:8-24) of the relationship of Wittgenstein's twelve themes of his philosophy of language and mind to information retrieval systems:

THEME 1: *Forms of life*
Language is much more than a self-contained, 'static system of definitions and syntax … [It] is intimately caught up in our activities and practices, what Wittgenstein called our "forms of life"' (Blair 2006:7). The common behaviour of humankind does not 'start from certain words, but from certain occasions or activities' (Blair 2006:8). '…words have meaning only in the stream of life' (Blair 2006:9).
THEME 2: *Narrative, story, play*
A passage in a play is an example of an 'expression with a very specific meaning' (Blair 2006:10).
THEME 3: *Vehicle of thought*
'When I think in language, there aren't "meanings" going through my mind in addition to the verbal expressions: the language is itself the vehicle of thought' (Blair 2006:12).
THEME 4: *Method of science*
'Our craving for generality has another main source: our preoccupation with the

method of science. I mean the method of reducing the explanation of natural phenomena to the smallest possible number of primitive natural laws …. Philosophers constantly see the method of science before their eyes, and are irresistibly tempted to ask and answer questions in the way science does. This tendency is the real source of metaphysics, and leads the philosopher into complete darkness. I want to say that it can never be our job to reduce anything to anything, or to explain anything. Philosophy really is "purely descriptive!"' (Blair 2006:13).
THEME 5: *Ancient city, maze*   'Our language can be seen as an ancient city: a maze of little streets and squares, of old and new houses, and of houses with additions from various periods; and this surrounded by a multitude of new boroughs with straight, regular streets and uniform houses' (Blair 2006:14).
THEME 6: *Multiplicity*   'But how many kinds of sentences are there? Say assertion, question, and command? – There are countless kinds; countless different kinds of use of what we call "symbols" "words," "sentences." And in this multiplicity is not something fixed, given once for all; but new types of language, new language-games, as we may say, come into existence, and others become obsolete and get forgotten' (Blair 2006:14).
THEME 7: *Meaning*   Many words do not have a precise meaning, which is not a shortcoming or drawback. 'To think it is would be like saying that the light of my reading lamp is no real light at all because it has no sharp boundary' (Blair 2006:16).
THEME 8: *Representation*   'We want to establish order in our knowledge of the use of language: an order with a particular end in view; one of many possible orders; not *the* order' (Blair 2006:17). [Italic in original] = language of representation (Blair 2006:18).
THEME 9: 'My method is not to sunder the hard from the soft, but to see the hardness of the soft' (Blair 2006:18).
THEME 10: *Thinking*   'One of the most dangerous of ideas for a philosopher is, oddly enough, that we think with our heads or in our heads. The idea of thinking as a process in the head, in a completely enclosed space, gives him something occult' (Blair 2006:20).
THEME 11: *Word and thing*

‘Let’s not imagine the meaning as an occult connection the mind makes between a word and a thing, and that this connection *contains* the whole usage of a word as the seed might be said to contain the tree’ (Blair 2006:22).
THEME 12: *Rules of usage* ‘For remember that in general we don’t use language according to strict rules – it hasn’t been taught to us by means of strict rules either. We, in our discussions on the other hand, constantly compare language with a calculus proceeding according to exact rules. This is a very one-sided way of looking at language. In practice, we very rarely use language as such a calculus. For not only do we not think of the rules of usage – of definitions, etc. – while using language, but when we are asked to give such rules, in most cases we aren’t able to do so. We are unable clearly to circumscribe the concepts we use; not because we don’t know their real definition, but because there is no real “definition’ to them. To suppose that there must be would be like supposing that whenever children play with a ball they play a game according to strict rules’ (Blair 2006:24).

There is much more to language than being a collection of meanings. It can be used to *do* things. Meaning is also a collective notion, its conventional use emerging from interactions found in language games played in everyday life, namely the use of language (Blair 2006:8). The meaning of most words is “taught” in the way it is said, how it is used, the context in which it is uttered, including that of different linguistic communities and experiences.

4.3 Information Retrieval Interaction and cognitive perspectives: Peter Ingwersen

> *[P]resent and future theory building in information science will have to introduce and consider ways that allow for* cognitive dynamics of information *in order to meet the demands from a rapidly changing world of actors* (Ingwersen 1992b:14).

What Ingwersen indicates as crucial in information science is the accessibility of information. Communication and uncertainty are considered together with the

epistemological diversity and concepts of information. These range from the more rigid and rational approach of positivism to more human-related perspectives such as cognitive viewpoints and later developments such as new semantic entities that are replacing traditional documents. This also reflects the shift in the interest of information science in mainly in technological aspects towards a focus on the 'human sphere in *interaction* with information technology' (emphasis in original) (Ingwersen 1992b:1). Three broad approaches that reflect developments in information retrieval are identified as the traditional, the user-oriented, and the cognitive information retrieval research approach (Ingwersen 1992b). A transformation from the traditional though the user-oriented into a cognitive approach takes place when information retrieval research takes serious the cognitive interaction between isolated models (Ingwersen 1992b:157). The paradigms in information retrieval research are grouped by Ellis (1996:174-195) under similar names, namely the archetypal approach and the cognitive approach.

Such a transformation seems to mirror developments in the cognitive view. According to Ingwersen (2001:3, 123) two major developmental phases of the cognitive approach in information science are the earlier user- and intermediary-oriented period, and the later period characterised by a more inclusive and holistic view of the interactive communication processes taking place during information transfer. The philosophical approach that Ingwersen focuses on is the cognitive view. The inspiration originated from cognitive psychology, which studies human information processing and many supporters of the cognitive view sees such studies as the basis for information studies. Ingwersen (1984:87), in the context of information retrieval, rephrases De Mey's (1984) formulation of the central point of the cognitive view as follows:

> any processing of information - whether perceptual or symbolic - is mediated by a system of categories or concepts, which - for the processing device - are a model of its world whether the device is a human being or a machine. The 'world model', often also named 'image' or 'world knowledge', consists of 'knowledge structures' and is determined by the individual and social/collective experiences, education, training, etc.

Ingwersen does not always explicitly state language as a key component of his philosophical approach, namely the cognitive view that influences his approach to information seeking and retrieval, but neither does he deny or obscure it from scrutiny:

> The most important dimension of the cognitive view is that during *any act* of human or computerized communication the [cognitive] viewpoint regards *all* communicated messages as *signs* transferred at a linguistic level. The signs may be transformed into information at a cognitive level only via perception and interpretation by the individual recipient's current state *in context* (Ingwersen & Järvelin 2005:36-37).
>
> Information comes to life by the combination of explicit semantic values, and is often the unspoken, i.e., the *implicit values*, the idea, situation or context the message tries to depict (emphasis in original) (Ingwersen & Järvelin 2005:43).

Even though there are criticisms of the cognitive view, it made important contributions towards understanding the ways in which users conceptualise their information needs and meaning-making. For example, Budd (2005:55) from a phenomenological position, states that Ingwersen admitted that information has the *potential* to inform and it only informs when perceived by someone, that the process of perception involves *intentionality*, and there is no unchanging or universal position held on information retrieval. Ingwersen (Ingwersen & Järvelin 2005) still upholds his position, but revised and extended it as the *holistic cognitive view* (socio-cognitive relevance) to allow for a sociological oriented approach with its socio-cultural context of information processes (Image 6[17]).

[17] Numbers on the models in images 6 and 7:
Processes of interaction (1-4): Social interaction between actor's past and present socio-cultural or organisational context (1); vertical interaction (4) of components 2 and 3, comprising core of information system; information interaction between cognitive actor and cognitive manifestations embedded in IT and objects via interfaces (2, 3).
Different kinds of generation and transformation of cognition or cognitive influence (5-8): Cognitive and emotional transformations and generation of potential information as wanted by actor (5, 7), and over time from social, cultural or organisation towards IT and information object components (6, 8) (Ingwersen & Järvelin 2005:261-262).

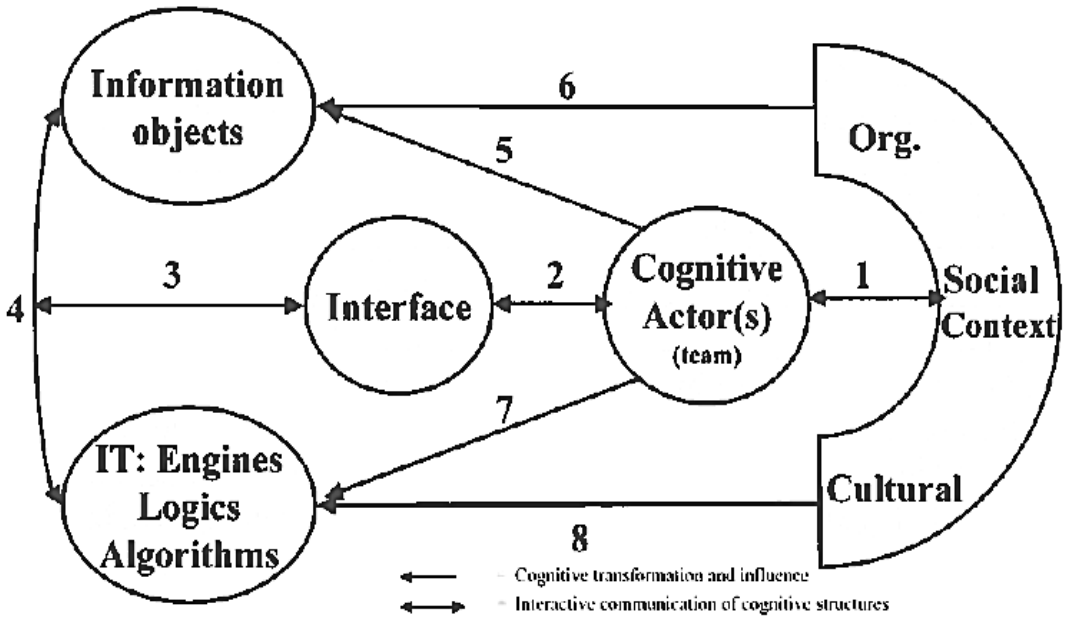


Image 7 The general cognitive framework for IS&R[18] research: Interactive information seeking, retrieval and behavioural processes (image from Ingwersen & Järvelin 2005:261)

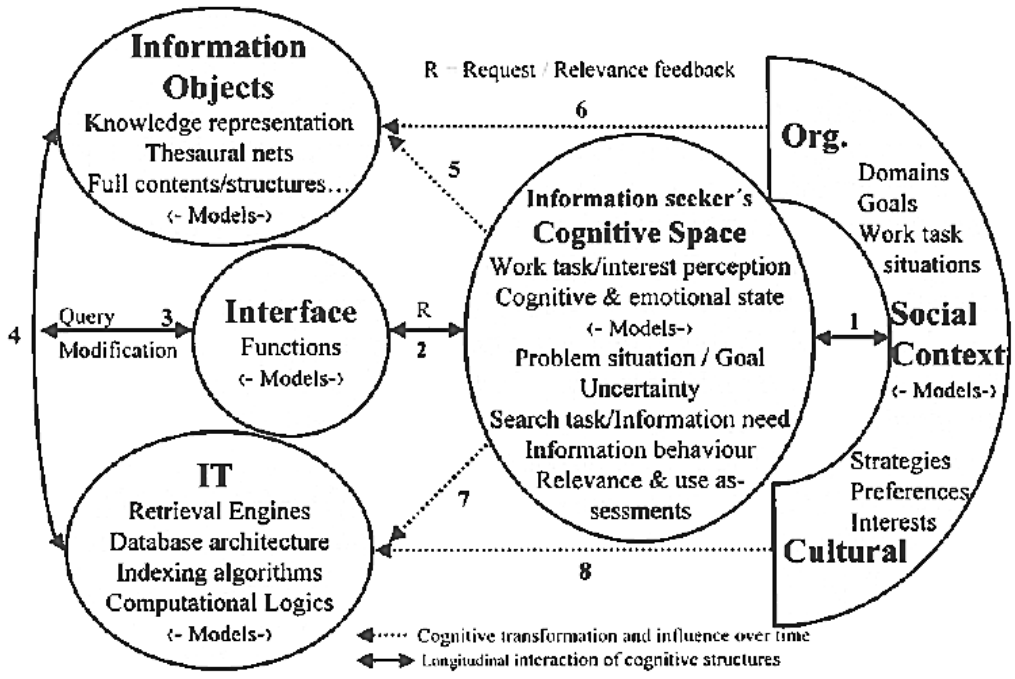


Image 8 The detailed cognitive IS&R model shows the complexity of the framework's cognitive structure: It includes changing role of the information seeker into generator over time (arrows 5 and 7) (image from Ingwersen & Järvelin 2005:274)

[18] Information Seeking and Retrieval

It also reflects a shift in the cognitive research in information science from the earlier individual cognitive approach (user- and intermediary-oriented) into that of the holistic cognitive view (all interactive communication processes during information transfer) with an integrated cognitive theory for information interaction and retrieval (IIR) (Ingwersen 1999, 2007:13). Image 8 indicates interaction and perception as the central processes of the cognitive information seeking and retrieval (IS&R) model (Ingwersen & Järvelin 2005:274). Hjørland's (2002b) suggestion of a socio-cognitive, domain-oriented approach as an alternative to individualistic approaches to the field of information science came as a reaction to criticisms of the individualistic cognitive view. According to Hjørland (2007), the empirical research by Ingwersen tends to be more bibliometric than cognitive in nature. Ingwersen's research is interdisciplinary in nature, since it constantly involves areas such as information technology, relevance and human behaviour.

Ingwersen applies the cognitive viewpoint, in a more holistic way, as an epistemological foundation for research in information seeking and retrieval (Ingwersen 1992b:viii). In an article that Ingwersen co-authored with Erica Cosijn, they indicate that relevance has become a major area of interest in information science. The view that information retrieval is a cognitive interactive relationship between human and computer is a move away from a systems or user-focused approach to information retrieval (Cosijn & Ingwersen 2000:533-534). This also shows that Ingwersen has not abandoned his cognitive stance.

According to Ingwersen, information retrieval is still concerned with problems such as effective information storage, access and searching by human individuals. The growth of information into many forms and media brings about 'a complex retrieval labyrinth' where there is 'a definite need for increased effort aimed at tailoring IR[19] performance to user demands' (Ingwersen 1992b:v). Also important is his assertion that information technology is no longer viewed as the sole solution to organising, providing and using information, but rather that the qualitative aspects *are* important in these processes. In acknowledging the key positions of intellectual access and use of information (structured and unstructured) the recognition of a more inclusive

[19] Information retrieval

approach is made possible. It may even help to overcome the fragmentary nature of theory in information science (Ingwersen 1992b:vii-viii). This fragmentation must not be confused with the subdivisions always taking place in the sciences into specialisations or disciplines due to an increase in knowledge and new understandings within a particular field of study. Ingwersen traces the developments and trends in library and information in context of the contributions made to theory and practice by, for example, Shera, Belkin, Debons, Wersig, Kochen, Saracevic, Capurro, Cronin, Vakkari and Brookes.

These trends have in common a concern with accessibility and use, as well as a human-centred focus. Belkin (1978) has often been quoted on the goal (or definition) of information science as being the facilitation of desired information through effective communication between human generator and human user. To Ingwersen ‘present and future theory building in information science will have to introduce and consider ways that allow for *cognitive dynamics of information* in order to meet the demands from a rapidly changing world of actors’ (1992b:14). Theory building in a rapidly changing environment needs to seek for a balanced perspective on the relationship between technology and human users as put forward by the holistic approach of Capurro’s information ecology. Information science cannot avoid being involved with human cognition and cognitive processes (Ingwersen 1992b:15). Philosophically and epistemologically, Ingwersen is clear about his cognitive viewpoint. Due to the nature of retrieval systems, aspects of language are crucial, such as natural language representation (structured, single term, single term in context and single term with weighting) (Ingwersen 1992b:67-68). Ingwersen does pay attention to language issues and has made important contributions.

Ingwersen and Järvelin's (2005:278) cognitive framework for information seeking and retrieval, shown in Image 9, demonstrates the central components of the framework positioned around the information seeker. The position comprises both the physical world and directly observable entities (social and physical level), and when seen by information seekers as their cognitive-emotional level.

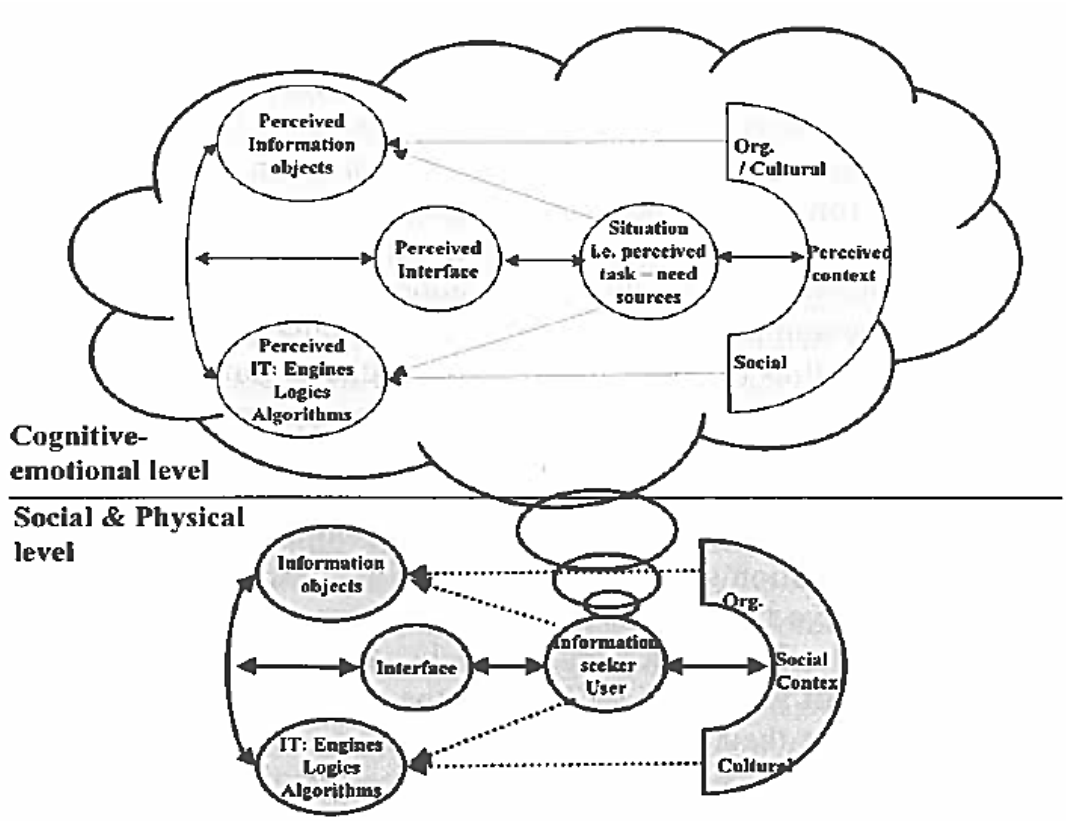


Image 9 Central components of the cognitive framework for IS&R centred around the information seeker (arrows correspond to arrows in Image 8) (image from Ingwersen & Järvelin 2005:278)

4.4 Inventive reading: shifting the boundaries of knowledge

From the first moment that humans started to assemble documents and records, they have been interested in ways of arranging them. Systematic grouping lies at the base of every well-managed life and occupation. In the record of libraries throughout the ages, there is evidence of the preoccupation with the question of systematic grouping. It has assumed a complexity over the years that may be “attributed in part to the tendency of man to seek scientific or philosophical reasons for the processes which they employ” (Maltby 1975:15) as a key to knowledge. This is of course also due to the rapid increase in the number of documents published and the propensity of more and more books and documents to deal with highly specific themes or with the overlapping of conventional subject disciplines. Information retrieval is understood as the guiding to or tracing of intellectual content contained in a source. The main concern is about more than retrieving a record or reference to a record.

Any information-related work has to have knowledge of the physical (medium) *and* content (message) aspects of the record. The relationship and interaction between the human user and the systems used for information retrieval is fluid, changing and complex. This involves world views, understanding, meaning, expectation, relevance, value, truth and acceptance of the representation of the universe of knowledge by a particular classification system.

In the quest to acquire knowledge, the ability to think and make connections organise, structure, combine, imagine and direct insight and understanding. How closed or open thinking is in allowing a space and place for the new and the other, is influenced by cultural environment and background, different types of thinking attitude, what activates and inspires a particular way of thinking. The practice of reading, or the reading act, as an interpretive act can be seen as understanding meaning in search of knowledge (De Beer 1999:437). The search for knowledge is represented in Table 5 according to five modalities of reading. The modalities of reading reflect the different modes of thinking identified in Table 1. The modalities and modes of thinking are both non-exclusive frameworks that show the artificial of separating, or considering as separate, how humans think, read and understand the implicit and explicit ways of knowing. The subjective dimension of implicit knowledge broadens the scope of theories of knowledge based on positivist thinking and recognises the relation of science to society by opposing the elimination from science personal human appraisals (Polanyi 1964), thus rejecting the oppositional approach of the objective-subjective distinction. The type of thinking necessary to counter disjunctive approaches to knowledge is independent, inventive and creative thinking.

Table 5 'Every reading act is born of a search for knowledge' (recreated from De Beer 1999:458-459)

Modality	Reproductive	Hermeneutic	Ideology-critical	Deconstructive	Euretic
Status of document	Product	Meaning	Ideology	Text	Composition
Document units	Letters	Signifiers	Distortions	Traces	Gaps
What happens to unit (1)	Decoded	Received	Unmasked	Differentiated	Evoked
What happens to unit (2)	Reproduced	Interpreted	Communicated	Mimetised	Inferenced
Orientation focus	Rigid	Supple	Agonic	Playful	Inventive
Quality of reading	Final	Preliminary	Emancipatory	Undecidable	Acquiescent

The reproductive reading modality treats the text as closed and self-contained to be decoded and reproduced based on the literal meaning of its content. This search for knowledge is about discovering the established meaning of a text as a closed unit, which is read to understand about what the text is, thus treated as a product (De Beer 1999:438). Such a generative approach does not allow for the complexity of language, whether that of the original author or that of the reader, in the use, contexts and interpretations of the meanings of words. Terminology of science (vocabulary, language) needs philosophical and conceptual accompaniment (De Beer 2007b). This includes meaning and meaning-making and the impact on the use of information by information users/seekers, making information and communication important concepts in understanding language.

4.5 Summary

Even though the main concern of information retrieval is with the intellectual content of information, it is ultimately a record or document, irrespective whether in printed or digital form, that is retrieved and consulted. The information profession and its systems often seem more concerned with a constant rush towards more efficient and accurate systems, tools and methods, often giving preference for predesigned systems and solutions. These invariably have shortcomings in compatibility and lifespan. Computerised retrieval systems do bring a new dimension to the interaction between the user and the retrieval system, changing the role of the traditional intermediary (the librarian) who used to stand between the user and the retrieval system. The role of computer developments is seen, for example, in the semantic web, which gives structure to the Web allowing computers to deal with its content in meaningful ways (McKechni & Pettigrew 2002). Day examines information according to the information seeking and retrieval paradigm with ‘persons and documents as dialectically constructed subjects and objects … [what he calls] the modern documentary tradition’ (2019: loc 116).

CHAPTER FIVE

A NEW DISPENSATION FOR INFORMATION SCIENCE

Perhaps this age of specialists is in need of creative trespassers (Koestler 1959)[20]

5.1 Introduction: The philosophical as thinking attitude

Chapter 5 proposes a new dispensation for information practice, relating to *the philosophical* attitudes within information science; and draws on *the philosophical* and language together in information science theory and practice. The *multiple collective intellection* of Michel Serres (1982, 1997, 2008) is proposed as the organising quality for making multiple connections and comprehensive thinking possible. The objective is to contribute to a mapping of information science from the viewpoint of it in an inter- and post-scientific position, thus linking to the theme of the study that entails the *philosophical as a thinking attitude in information science* at theoretical and practical levels, and the kind of science information science can become. It includes what information science might look like within a new conception of science, a scientific viewpoint of which information science could serve as a model (for example as an inter-science or as a post-scientific discipline). In determining the nature of information science as a science, what *science* is and the relevance of existing definitions of science (its object, methods, impact of positivism) need to be scrutinised. This includes what happened to the original purpose of science, being about knowing and knowledge, which reflected its roots as *natural philosophy*, thus the possible synthesising role of philosophy between different kinds of science.

The different areas of information science on which philosophical ideas or approaches had an impact, include both the discipline and its traditional practice counterpart, the library. Information retrieval shows the close link between ideas and

[20] Koestler (1959), inspired by the gulf-bridging task undertaken by Herbert Butterfield, a professor of Modern History, into mediaeval Science.

action, especially in how the universe of knowledge is represented. This involves the user (user studies, readership) as central to the information profession. Information retrieval forms an important historical link in the development of library science and eventually information science. The history of any science and its disciplines is inseparable from the dominant philosophical thoughts of the time, including the relationship between information science and philosophy. Information science cannot isolate itself from the investigations taking place across disciplinary and scientific boundaries about the relationship between knowledge and theories (philosophy of the social sciences), and knowledge and the sciences; what science is, specifically contemporary science; the study of information; and shifting and diffusing world views (Coetzee 1977; Lash 2002).

The questions guiding this chapter are: What are the implications of discrediting the role and importance of these developments for information science, especially in claiming information and the information user as its main foci? In the face of such a ‘plurality of approaches’ (Furner 2010:169), what kind of discipline (or science) could, or might, information science become (inter- (between, in-between), intra- (within), meta- (over, above, about, mega))?

5.2 The multiple, connective intellection mode of thought

From the large number of philosophical approaches in information science, a strong and urgent rethinking of the subject field is phrased in terms of the implications of undeclared or hidden assumptions; and in terms of the connections between disciplines in the narrow sense, and between sciences in the broader sense. Traditional philosophy often treats the faculties of knowledge and reason as superior to those of inspiration and emotion (the influence of Plato’s distrust in poets), and initially neglected a more rigorous investigation of the unconscious mind in contrast to what was already being done in psychology (especially by Sigmund Freud) (Archard 1984:15). A sharp dichotomy was therefore drawn, but which turned out difficult to maintain since the poetic and the calculative ways of thinking together offer more creative and diverse solutions, understandings and new pathways

towards new knowledge. The same holds true for the impossibility of not transgressing the boundaries between disciplines. It is also significant that many information science scholars and practitioners come from multidisciplinary backgrounds, providing a rich opportunity for the use and development of theory from within information science (McKechni & Pettigrew 2002).

5.2.1 Science and the modern invention of information

The predominance and appropriation of certain questions by philosophy is called into question as boundaries fade between many of the human and social sciences, such as philosophy and literature, especially when science is accepted as an activity of thought (De Beer 2015). Ambivalent relationships between disciplines, and between otherness and similarity, are often found. These seemingly irreconcilable relationships should not be treated as competing opposites, but as unique entities that each offer unique truths or world views worthy of attention (De Beer (2005) on Derrida's approach to dualism). This requires an interdisciplinary or pluralistic approach. Information science, in a way similar to philosophy, needs to come to terms with what lies beyond its self-imposed borders, and the interrelatedness between itself and the world beyond its boundaries, in the face of the seemingly unbridgeable chasm separating the humanities from the philosophy of nature. The transformation of how knowledge acquisition is approached, with a move away from the absolute or fixed world view towards the uncertain and the chaotic, may seem like a sudden and even contemporary eruption, yet it has been gathering over a long time:

> Those men who created the upheaval which we now call the "Scientific Revolution" called it by a quite different name: the "New Philosophy" … their aim was not the conquest of Nature, but the understanding of Nature (Koestler 1959:13).

Communication between the scientific and humanistic cultures is possible according to Serres (1982:xi-xii) because their artificially imposed boundaries are transcended by the problems they have in common. Universities, unfortunately, reinforce the

divisions and creating a gulf that discourages unconventional crossings. The increase in specialisations and divisions in knowledge is turning science into a trade, separating from its object, namely knowledge (Serres 1982:xii). Serres (1989:3-5) warns of the danger when the exact sciences become dominant as one kind of culture, a culture where the factual “rightness” of the exact science gives it legitimacy over other ways of knowing and experiencing. The orderly and compartmentalised way of thinking, if adopted without caution, can lead to fragmentation instead of specialisation. Literature as a resource for science is used by Serres (1989:6-7) to indicate that imagination and inventiveness comes first and then afterwards the method and rigor of reason. Science in this manner makes possible alternative perspectives on what Serres (1989:7) refers to as imaginative works. Serres has ‘detected as much myth in the sciences as true knowledge in myths’ (Serres 1989:12). In recognising and allowing for the existence of the creative in the scientific and the scientific in imaginative work, the paralysis or deadlock caused by excluding everything that is not certain, factual or formal reason, is broken. The mutual enrichment of the poem and the theorem is through experimentation and enrichment. In science, it is the imagination that opens up new worlds (discoveries) and inspires inventions (Serres 1989:11-13, 34); and fiction (science fiction) ‘is scientific knowledge anticipated’ (Serres 1989:15).

A science that keeps itself cut off from external cultural and scientific exchanges becomes sterile as it can only reproduce itself (Serres 1989:18). The natural sciences and the humanities are synthesised through the transformational role of philosophy. The exact sciences and the sciences of man (Serres 1982:xi) are linked by *passages* that are unlike that of traditional classifications of knowledge. These passages or labyrinths are more like the narrow, often blocked or inaccessible passage connecting the Atlantic to the Pacific across a space that is not homogeneous or empty (channels or passages of the Northwest Passage).

Through synthesis the ‘traditional dualisms that separate the sciences and the humanities’ (Zembylas 2002:480) can be transcended. This includes the boundaries of the disciplines within the sciences. It is at their crossroads that new directions of knowledge or research are created and discovered. This can be compared to the

architect Bernard Tschumi's point-grid (1998) which brings together disparate and irreconcilable aspects for scrutiny and new meanings.

No discipline is therefore an island. Despite this, a strong focus on the practical concerns of the information science discipline seems to have led to a paucity of deeper discussions on and investigations into broader themes such as pragmatism, truth and interpretation within the discipline itself. These themes are of a philosophical nature and include the impact that empiricism had on information science (Benoit 2005:163). Radford and Budd also concluded that the 'invisible epistemological structures and paradigms of our field have not been raised, until very recently, to philosophical scrutiny' (Radford & Budd 1997:320). The practices of library institutions, for example, are too often accepted as a given by practitioners and scholars in the field.

The field of information science limits itself before it has even begun to identify and understand the underlying philosophies that shape its acceptance of certain practices and knowledge, and the exclusion of others. For example, any possible 'confusion' is limited as far as possible, and therefore also any chance of creative and new ways of understanding 'how knowledge about library processes is generated and given validity in library scholarship' (Radford & Budd 1997:320). Such investigations bring together the normative questions of philosophy and the empirical investigations of the social sciences. The historical background of ideas and the realisation that our knowledge is always incomplete, reveal the 'retrospective relationships [that exist] between theory and practice, uncovered by constant philosophical inquiry into them' (Nitecki 1993).

Information science, as an interscience (De Beer 2015), for example, necessitates a reconsideration of different modes of thinking; the role played by interconcepts; reflection; interdependence of knowledge, science and thinking; and other neglected issues in information science that need exploration. The general interconnectedness of various disciplines is a joint interest shared by information science and philosophy, and therefore the general connection between knowledges; including seemingly disparate ideas and concepts. The nature of this kind of pursuit of thinking (De Beer 2007b) needs to be creative and inventive in how it relates to information and

knowledge, knowledge for action and human thinking. For instance, both the cultural and the natural environments imprint cognitive activity and thinking styles, including effects of changes and shifts in emphasis in such environments.

5.2.2 *Passage*: navigating the knowledge space

The importance of knowledge is in the navigation of the knowledge space, because prosperity depends on this navigation (De Beer 2011). It requires a life-informing attitude that challenges the knowledge worker to learn and share without limits. To inform well, an understanding of knowledge is necessary to reverse the process of losing knowledge. A more comprehensive literariness is desirable to take information science beyond the mechanical transfer of knowledge as one might do with cold, manageable objects. The relationship of dynamic knowledge to information lies in knowledge-in-action.

A philosophy of transport can be used by a pluralistic epistemology to counter the dogmatism of a unified, systematic knowledge (Serres 1982:xxii-xxiii). *Multiple Connective Intellection* (MCI) (Serres) makes connections, or makes connections possible, as translation of spirit/mind, organisational quality. The connecting of ideas, item in restless, dynamic and complex system, is a thoughtful activity beyond mere rationality, a kind of collective wisdom. *Intellection* is to act intelligently or with our intellect, to be intelligent or to be intellectual; thus, action and being of intelligence equals *nous* (Greek for mind or spirit) (Kypros.org lexicon 2013, sv ‘nous’), the base for noology and the noosphere[21] (Morin 1992). Hermes as messenger of the gods, information messenger and interpreter, and representative of knowledge workers embodies *Multiple Connective Intellection* (Serres 1982).

[21] Noology is defined by Morin as the ‘proper organization [of the things of the mind], notably logical and paradigmatic’, and noosphere as ‘the specific reality of the “things of the mind”’ (Morin 1992:xlv).

The main pathways or principles identified in the work of Serres are:

1) *Communication* - conversation as voyage/translation/exchange under the sign of Hermes, the voyager god of paths and crossroads who guides and protects.
2) *Interference* (inter-reference) - a new scientific spirit as a philosophy of transport, thus, of intersection, intervention, interception, the means by which messages interfere with and refer to each other.
3) *Traduction* (translation) - epistemology and history of science, including impact of science and technology in the aesthetic domain; translates messages and evaluates their transformations.
4) *Distribution* (dissemination) - the intermingling of communication theory, thermodynamics and topology, relations among the sciences; marks the end of the stable systems of classical science with the message becoming chaotic and scattered; *La Distribution* is another name for disorder: water, steam, fuel constitute fluctuating groups.
5) *The Northwest Passage* - undulating, nodular roads or pathways between the sciences, literature and philosophy; an intricate maze or labyrinth with dead ends and blocked paths, the difficult and unique bridge of connections and relations from the humanities to the exact sciences; passages among and between fluctuating groups of universal forms and individual circumstances.

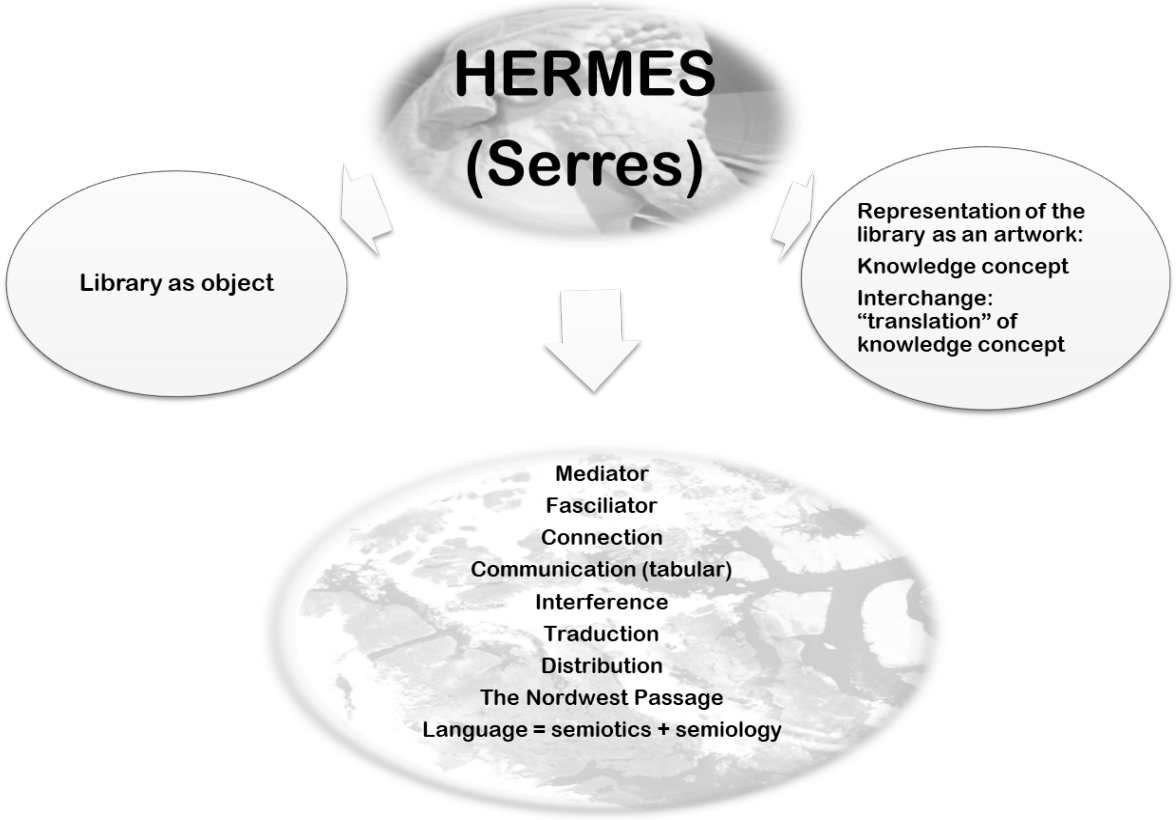


Figure 16 Navigating knowledge spaces: Hermes as traveller, messenger, creator and trickster (image created by the author)

The method of passage is that of the journey (Figure 16). This hermetic journey, an excursion an expedition filled with random discoveries that exploits the varieties of spaces and times, relates etymologically to the English *random*, (Harari & Bell 1982:xxxvi-xxxviii). Important concepts emphasised in these pathways include topology, metaphor, navigation, connection, communication, invention, discovery, imagination and analogies. This becomes even more pertinent when travelling across, and transgressing, boundaries. Zembylas (2002:481) cites Serres in this connection:

> whether knowledge is written in philosophical, literary, or scientific language it nevertheless articulates a common set of problems that transcends academic disciplines and artificial boundaries.

Hermes serves as a character that connects, mediates and facilitates between the knowledge (translation, exchange) concept and the library as object. The Hermes figure represents in this study *communication* and *interference*, and thus involves language. Hermes, in the context of the philosophical in information science, shows how the '[d]ynamic and open spaces of knowledges and information developments' (De Beer 2007) can be navigated and traversed. Michel Serres makes use of the Hermes metaphor in various ways. Hermes is not only a messenger and navigator of the archipelago of our knowledge (the Northwest Passage), and traveller within the reality of others in order to see things from their perspective. Hermes is also the parasite that affords us different ways of understanding things and revealing alternate truths.

Hyde (2008), for example, refers to Hermes as a trickster who is playful, mischievous, subversive and amoral. Yet, the trickster is essential or indispensable when it comes to creativity, innovation and renewal in culture. Tricksters, or the Hermes's of the world, are part of our world's ongoing complexity and ambiguity, its beauty and its dirt.

Hermes is the guide that never stops connecting, disconnecting and reconnecting

> the endless variety of spaces he traverses … Hermes turns weaver of spaces … a weaving together, a junction, a connection of places that are closed, isolated, inviolable, inaccessible, dangerous, or mortal - disconnected (Harari & Bell 1982:xxxiii).

One might be tempted to refer to the nature of Hermes in a dichotomous manner, his light side and his dark side. Serres (1982), however, shows us that these two seemingly opposing characteristics of Hermes are part of the *same side* (if one would want to use the term 'side') of his personality. Both are crucial to who he is as a *whole*. This accentuates how crucial it is to overcome the dualism of dividing reality into two irreconcilable substances (for example Cartesian mind-matter dualisms[22] or

[22] Representing Descartes' ideas as simply coming down to a distinctive division between the body and the mind is a gross oversimplification of his work. Unfortunately, the concept "cartesianism" led to the understanding of his contributions mainly in this context of absolute divisions (see for example Archard 1984:15-16).

Platonic dualism), or dividing human nature against itself, such as soul and body, angel and beast. This includes the doctrine that the universe is governed by two distinct principles, namely good and evil (*The New lexicon: Webster's dictionary of the English language* 1990, sv 'dualism'). This makes Hermes an especially important metaphor in the teaching of the sciences, as explored and exposed by Serres.

Hermes travels across scientific boundaries without destruction of structure or disrespect for differences. Hermes is not a dualistic entity – he *is* good/evil, creative/mischievous, trickster/messenger. He is never just the one or the other, but always both simultaneously. Wolfram von Eschenbach's poem *Parzival* about the holy grail, for example, does not depict the grail as a Christian vessel, but as 'a sacred stone in which the opposing powers of light and darkness are reconciled in creative tension' (Clarke 2001:viii). Imagination and creativity are essential in exposing accepted dualisms for the sacred stones that they actually are, and have been all along.

Hermes, son of Zeus and Maia, is messenger of the gods as well as the god of wealth, luck, sleep and roads, and the conductor of souls to Hades. Hermes is also identified with "Hermes Trismegistus," which is the Greek name for the Egyptian god of wisdom, Thoth. Horowitz (1991:250) describes Hermes as the '[m]essenger-god who flew on winged sandals and carried a wand known as a *caduceus* …' Hyde (2008:315) also refers to the wand as Hermes' staff. Hermes as a baby depicts him with the traveller's hat, referred to as a *petasos* (Hyde 2008:201). It seems that travelling was to be part of Hermes from the start. Hyde (2008), in his translation of the Homeric hymn to Hermes, footnoted the word *wily*[23], offering alternative terms that give further clues to the character of Hermes. These alternate words are cunning, versatile, much travelled and polytropic (turning-many-ways).

[23] 'Maia gave birth to a wily boy' (Hyde 2008:317).

Image 10 Base of a funerary vase (410-400 BC) - Hermes Psychopompos, leader of souls, National Archaeology Museum, Athens (photograph by the author, 2013)

Image 11 Hermes' winged sandal (detail) - funerary lekythos (420-410 BC): Hermes Psychopompos leads young Myrrhine to Hades, National Archaeology Museum, Athens (photograph by the author, 2013)

Hermes works well as a character in the context of information science as an interdisciplinary kind of science, as well as a connector between the theoretical and practical aspects of the discipline. Serres' troubadour of knowledge demands acknowledgment of the role played by the philosophical in information science. This relates to what *kind* of interdisciplinary science (Althusser 1990) information science is, or could be. Before continuing with this train of thought, a consideration of who and what Hermes is about is necessary for an understanding of the relevance of the metaphor. Figure 17 maps the multiple, connective intellection onto information science:

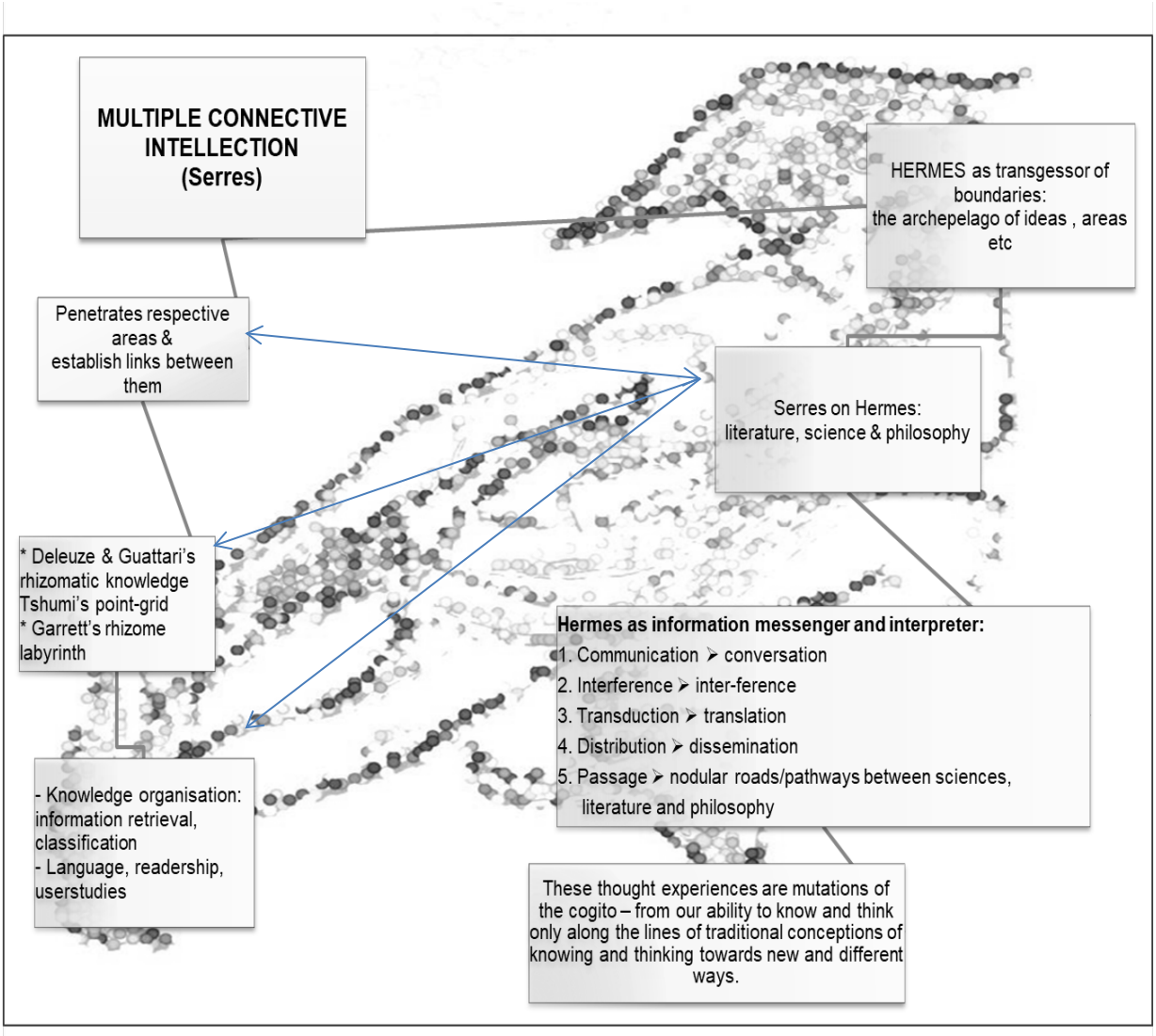


Figure 17 Passage - Hermes as information messenger and interpreter between the sciences, literature and philosophy (based on Serres 1982) (image created by the author)

5.2.3 All knowledge is incomplete

Information science research tends to be situated too much in the present day thereby neglecting its origins and contexts, focussing too much on certain geographical regions by neglecting the rest of the world and other ways of knowing (De Beer 2011). Re-establishing the connections and connectivity between people involves structures of feeling, cultures of critical discourse, emotional involvement and an awareness of a sense of place, belonging. Disaffected and disconnected individuals result in a sick society (De Beer 2011), dispirited by cultural misunderstandings due to a system of ignorance (Santos 2019). One needs to be also first literate in one's own culture and heritage, to be able to reach out to other's cultures.

All knowledge is incomplete, promising deep epistemology variety, making it essential not to waste experience. Ecologies of knowledges (Santos 2019) should not be treated as *versus* scientific valid knowledge. Neither one is the only knowledge. All knowledge systems have different purposes and therefore require need different knowledges. Integrated systems allow for reciprocal dialogues of both/and not either/or logic - both-ways transculturation (Manathunga 2014).

Santos (2019) identifies ecologies that disturb equilibrium and how to counter them:

- existing monoculture | shared futures based on separate(d) pasts
- naturalised ecology of differences | quality focus to counter disintegration
- linear time, single direction, hierarchy | bring in cyclic, spiral time
- of scales: global is local; i) universal - slow, forms of temporality, ii) particular, iii) trans-scale - relevance
- of productivity in single cycle: i) land has to rest, ii) hours of work and of rest are out of sync
- training conformists, incompetent rebels | rather train competent rebels

It is important to open the canon of knowledge through encouraging multidirectional, rhizomatic thinking. The spheres of knowledge entail physics/phusis – bios – anthropos. The enemies of complexity are simplification, reductive, idealist, atomising, totalising, systemic and cybernetic (De Beer 2011). The two modes of knowledge, namely the scientific, verification, intensive/intrusive mode, and the risk-taking, inventiveness mode, together form and influence the ecology of knowledges.

> [T]he ecologies of knowledge … both denounce the abyssal exclusion and injustice of current social arrangements (sociology of absences) and propose efficient solutions of liberation emerging in society (sociology of emergences) (Santos 2019).

In setting the social, political and epistemological context, Santos (2019) not only questions whether we are in a post-colonial world, but also states that it is our responsibility to raise the question. Santos suggests that we are still in a colonial world which morphed into a more abstract and disguised form. The “de-colonise” conversation places a negative focus on *de*-, instead of asking what will be put in its place, thus discounting the global trend in which other strong forces are in the process of *re*-colonising. The arrogance of those being or seeing themselves as the *lucid* ones forgets there are still *ghosts* with us (Santos 2019). This sightless arrogance misses the independent and dependent variables of the impact of such changes on education, of education and on any transformation. The domination looks like the “normal” kind - it looks like a world without rivals for what we do; adapt to change, no alternatives. A process of complex situations - non-relational, for example as seen with the buzzword “entrepreneurs” - expect them to be autonomous but without the conditions of autonomous /autonomy, therefore *slaves*. Non-relationality contaminates, replaces responsibilities for *guilt*, which is a major problem. Social relations fade away when conflict is removed.

5.3 Information science and the idea of a post-scientific position

Implications for humanity; direction of enquiry must be changed – urgently. The crisis is not about the nature of science, but about what science could mean for society. By focusing on factual science only we risk a loss of knowing, knowledge entities and therefore information entities and such a focus makes merely 'fact-bound' people. The traditional notion of science or conceptions of research involve assumptions about reality and its objectivity, observability and "know-ability." Alternative conceptions are needed for science proper (realism, object and subject) and method by which a subject approaches the object. When we objectify the "object," it is cut loose from its environment and the subject is stripped of feelings, meaning and thus method.

It is therefore crucial to re-think the sciences by reconceptualising the notion of the traditional sciences, and therefore also of information science. The conception or notion of science influences and informs information work (e.g. user behaviour, information management). Re-definition with evidence gears information science towards the creation, facilitation of meaningful human existence in its fullness. Phantasy, dreams, creativity, imagination, the fantastic, excitement are all missed when the object is removed from its surrounds. These all form part of human intellectual capacity. The meaning-giving and meaning-creating "business" might save us from ourselves and from one another. The re-invention of knowledge and information as meaning-making activity is necessary.

5.3.1 A human focus in an age of intelligent machines

'Industrialisation of the mind', its mechanisation and instrumentalisation, makes a redefinition or description of who, what and how human beings are, unavoidable. Conceptions of the world as "machine" have a long history and such a conception seems inevitable when considering the almost casual contemporary use of terms such as cyborg, cyberpunk, post-human, virtual reality and virtual identity. The shift in the field of information science from document-oriented approaches to that of more human-focused approaches also affected a shift from machine-human

relations to *human-machine* relations. The dominant philosophical approaches reflecting this state of affairs, address the question of human fulfilment related to the consequences of human action, information overload and new avenues of creativity.

The challenge is to find an embodiment for human foci and actions in an age of intelligent machines, thus necessitating the identification of the implications of technological developments for the sciences and society. Luc Steels' (2003:134) chapter on social language learning, a theory of learning that places the emphasis on social interaction and cultural context in contrast to individualistic theories of learning (passive receiver or genetically pre-programmed organism). Steels focuses on how meaning is constructed - how we go from information to knowledge; how grounded meaning arises, that is 'meaning anchored in sensori [sic]-motor experiences' (Steels 2003:134). What is of particular interest is his choice of methodology, namely using the theoretical assumptions of the construction of artificial systems (robots). These assumptions, according to Steels, allow more precise examination of how learning mechanisms work, and what they can achieve or not. Steels' section on the origins of meaning aims to understand the creative semiological process in inventing/creating new meanings and ways to communicate them. He refers to the debates in cognitive science on the origins of meaning, especially the nature/nurture debate and a constructivist synthesis of Johnson (Steels 2003:134). Two of the main approaches to explain how language and meaning are pulled together, are individualistic and social learning (or labelling versus social grounding). Both approaches focus on the relation between language and meaning, natural language communication, and Wittgenstein's views on the causal influence of language on meaning (Steels 2003:136-138).

The radical impact of information and communication technologies on the human condition modifies relationship to concepts and interaction with a reality that changes too quickly. The concept re-engineering is addressed in the *Onlife* initiative and *Onlife Manifesto* (Floridi 2013). Being human in a hyperconnected era brings challenges brought by the blurring of distinction between reality and virtuality, and also the blurring distinction between human, machine and nature. Examples of such blurring are 3D printing, virtualisation of the real and reification of the virtual. The world had been adapting to AI limited capacities increasingly well. Thus, adapting

environment to ‘stupid’ technology anyway and *enveloping* the world without realising it. In Robotics, an envelope is three- dimensional space defining boundaries, for example a dishwasher is a “clever” robot doing dishes as you would do it, which also makes it “stupid” - a robotic arm affixed above basin. Another example is being on the internet, not at work or home but on the move - enveloped (within envelope). A step further is the blurring distinction between human, machine, nature where the robot arm is controlled with thoughts (BrainGate). Algorithms get a human hand in steering the web, thus *memory outperforms intelligence* (Floridi 2013). The shift is from primacy of entities to interaction, perhaps there will be more connected devices than people: “To be is to (be) interact(able)” – Quine. The major revolutions are summarised by Floridi as follows:

Copernicus - we are not immobile, at centre of universe
Darwin - not unnaturally detached and diverse from rest of animal world
Freud - not Cartesian subjects transparent to ourselves
Turing - not disconnected agents, but informational organisms (“inforgs”), sharing biological and engineering agents

5.3.2 Information science in a dynamic, restless and complex sphere of knowing

The generally accepted notion of science is built on certain assumptions about reality as object and its knowability, the subject and its knowing capacity, knowledge and its depths and boundaries. This notion of science emphasises the importance of subject/object division, the mastery of objects by subjects, a fixed “real,” method as straightforward and knowledge is final. Rethinking science, the subject-object relationship and the place and role of method is central in rethinking the scientific position of information science (De Beer 2015). By only focusing on factual science, there is a real risk of losing knowing, knowledge entities and therefore information entities; and such a focus makes merely “fact-bound” people. Yet, we are not only rational beings, but also spiritual. Alternative conceptions are needed to counter that which objectify the “object” by cutting it loose from its environment and strip the

subject of feeling and meaning. Thus, it is crucial to re-think the sciences by reconceptualising the notion of the traditional sciences, and therefore also of information science. The conception or notion of science influences and informs our work, for example user behaviour. Re-definition = evidence = gear information science towards the creation, facilitation of meaningful human existence in its fullness. Phantasy, dreams, creativity, imagination, the fantastic, excitement are all missed when the object is removed from its surrounds. These all form part of human intellectual capacity. The meaning-giving and –creating “business” saves us from ourselves and from one another. The re-invention of knowledge and information as meaning-making activity is necessary (De Beer 2015).

Scientific methodology is included in the five issues central to the new conception of science and not separated from theory:

- Place of world views in science
- Relativism of scientific knowledge compared to other types of knowledge and discourses
- Social paradigms of scientific knowledge
- Meaning of assumptions
- The effect on theories and methods

The variety and origin of theories and methodologies in information science, as revealed in the reviewed literature and the chapter on the different philosophical attitudes towards information science, might imply that it must be because the field has an interdisciplinary nature. This raises three questions, the first whether the interdisciplinary nature of information science complicates or enriches the variety of theoretical and methodological choices available (especially when irresponsible cross-borrowing is involved); and the second question of whether the current situation in information science presents a viable opportunity for the recognition of philosophical viewpoints in the discipline. The third question, depending on how the first two questions are answered, is whether the term *interdisciplinary* is still appropriate or even correct. To fulfil the aim, the questions are addresses by linking them to information and knowledge, and more specifically, to *human thinking plus*

knowledge for action equals inventive thinking. Computer developments and the industrialisation of the mind (mechanisation, instrumentalisation) resulted in a myriad of redefinitions and re-description of who, what and how human beings *are*. Conceptions of the world as ‘machine’ have a long history and such a conception seems inevitable, raising the question of how human fulfilment relates to the consequences of human action, overload and creativity.

Hermeneutics, as interpretation and understanding, offers four methods: thinking, reflection (on assumptions and prejudices), meaning and understanding (establish connections), and inventiveness (inventing the future, creativity). The first consideration is information science as a post-scientific model. A second possibility is information philosophy as the pursuit of thinking that is compositional (acritical, complex, multiple and inventive (De Beer 2007a)) in its knowledge, method, science and ethics.

It seems as if the success of rational planning and ingenuity is based on carelessness towards thought and a serious lack of reflection and deliberation, thus renouncing and rejecting the essence of humans, namely the faculty of thought. The signs that the tide is turning as seen for instance in the increasing pressure for allowing other ways of knowing. This call for a transformation, a renaissance, in the basis and foundation for thinking about knowledge is part of recognising the various dimensions of culture. In his description of the origin of thought, Morin (1991) explicates these ideas clearly. Concerning the prehistory of human thought, he writes that the "organisation of life" is really a precondition for it. This organisation entails the following:

1) quasi-informational dimension (the genetic message that is fixed in the genes and the ability to extract information from the environment)
2) quasi-computational dimension (the handling of internal and external data)
3) communicative dimension (communication internal to the DNA-proteins and from external to it)

All three dimensions are interwoven. This implies that an undifferentiated thought dimension exists within every living organism. This dimension is concerned not only with the organism's internal organisation, but also enables it to distinguish between itself and others, search for food, flee from danger and resist aggression. Without the original cognitive dimension that is inherent to living organisms, there could never have been the development of knowledge and intelligence that would eventually lead to thought. The realm of bacteria and vegetable life shows systems of information exchange, even if in a very programmed and undifferentiated way. Animal life, however, shows that cognitive intelligence is associated with certain behavioural patterns. We thus have intelligence that is not merely cognitive, but above all practical, with tendencies to improvise and invent. In addition to the various dimensions of culture and the various cognitive attitudes, we must take note of the deployment of dual thinking (Morin 1991).

5.4 Summary

Scientific thought has owed its dramatic rise to a dialogue between imagination, verification, empiricism and rationality. There are no certainties upon which claims to knowledge can be built. Uncertainty, confusion, chaos and inconsistencies dominate in both the short and the long term. The rejection of the existing knowledge enterprise is associated with an attack on the certainties of reason, the empirical method, regularity, order and the distinction between facts and values. The alternative approach is about dissemination, discontinuity, tabularity, the rhizomatic, chaos, coincidence, paradox and unpredictability (De Beer 1996). Serres' mode of thought to cope with vast and complex challenge (restless dynamic system) is our multiple, connective intellection to penetrate all the respective areas and establish links between them.

CHAPTER SIX

FINDINGS, RECOMMENDATIONS AND CONCLUSION

6.1 Introduction: Findings and implications

The findings link to the tension of paradoxes, or the “space” between (or the “in”-between of) seemingly opposing viewpoints, and are reflected in the implications and recommendations of this chapter. The role of philosophical approaches in information science influences whether it is considered a “problem” when determining the nature, theory and practical aspects of information science as a discipline. Alternatively, as creative encounters that contribute towards knowledge and awareness of the effects of philosophical theories on concerns perceived as central research areas within information science and its domains. This was illustrated by way of the pathways to how philosophical thinking manifests in information science theory and application. Information retrieval styles and designs, for example, often reveal how language is understood according to a dominant or preferred philosophy of language. A unified and systematic view of knowledge in a fluid, ever-changing world can serve only as a model and at that, always an impermanent one.

Comparative and pluralistic methods may assist to avoid the danger of seeking and implementing fixed methodologies in the search for “a” theory of information science. There are theories and practices unique to information science, but these did not come about or develop in scientific or disciplinary isolation. Their uniqueness often lies not in their origin, but rather in the application, context or adaptation.

The findings have implications for information science theory and practice are, but not limited to, the following:

1) The philosophical in information science is approached and re-evaluated by revisiting existing viewpoints and attitudes towards philosophy in information science within existing and new contexts by looking across more than just disciplinary borders. Examples of such borders are terminology (n-revolution, -era, -reality), institutional (subject field, department, university, industry), literature (favoured), space (physical, virtual, emotional), perspective (self, group, other), approach to life, work and action (ideology, paradigm, assumptions), national (international, global), professional (application, service), and research (dynamic, enthusiasm).
2) Such an approach requires a subsequent, complementary methodology towards identifying underlying philosophies and thinking styles in information science and through other disciplines, because knowledge is influenced by different and varied philosophical attitudes. It might be possible to detect changes and movements within philosophical attitudes by a re-examination of such attitudes and supported by a corresponding methodology.
3) This asks for an orientation that is mindful of a certain amount of blindness that can be found in assumptions and ideologies, and an awareness of the danger of hanging onto them due to their familiarity, acceptance, popularity or enforcement.

The broader implications of the study, at a societal level, are as follows:

1) Reclaiming information for the human (and the humane) by finding an embodiment for human foci and actions in an age of intelligent machines, thus identifying implications that technological developments might hold for science and society.
2) Awareness of, and sensitivity towards, the challenges in cultural diversification, for example whose language is used for public dialogue (concepts, meanings, mode of communication), including implicit modes of speaking. This includes advancing challenging deliberations for different purposes and contexts.
3) Creating opportunities to learn how to identify deeper motivations that are overt or not known, as well as the causes of such motivations (for

example underlying assumptions and philosophies), requiring becoming versed in about what the underlying approaches are.

6.2 Recommendations

The cross-border journey brings with it exciting encounters in the form of challenges that information science cannot, and should not, ignore. The prominence of information and informational interests in contemporary society necessitates an information science discipline that chooses to take a more central, and less apologetic, place in the institutional and scientific milieu. To ensure such a position is tenable, it is recommended that scholars of the discipline continuously strive for a sophisticated and inclusive scientific practice and theoretical development, with a concomitant interdisciplinary sensitive nature. Addressing necessities *and* possibilities requires more than renewing or restructuring of curricula, research and professional practices.

This connects with the next recommendation, namely to undertake an empirical study on how philosophy and the philosophical are embedded in information science research. For instance, it could investigate the influence of philosophy or technology on in the decision taken by certain South African universities to rethink and even redesign their information science research and study programmes. Innovation, for example, is seen as the main source of productivity. This makes knowledge and information the essential materials of the contemporary production process (informational capitalism). Education, therefore, remains the main or key quality of labour. The key to this is comprehensive thinking. However, for these endeavours to succeed, it is crucial to identify the camouflaged obstacles to comprehensive thinking. The obstacles identified by De Beer (2016), summarised in table 6, are examples of types of literacy or ways of reading. It does not make the statements listed in the first column obsolete or useless. These only become obstacles when treated as the only or sole focus. Thus, what may seem like an adequate response to a particular challenge, while being able to determine quality, becomes dangerous

and result in intellectual degeneration when it neglects cultivating comprehensive literacy.

Table 6 Camouflaged obstacles to comprehensive thinking (based on De Beer 2016:36)

FUNCTIONAL READERS: SKILLS AND TRAINING DEVELOPMENT	Gap	COMPREHENSIVE READERS: CULTIVATION OF THINKING
Concentration on functional literacy (computer-, science-, information literacy, etc) for vocational needs of present time	without regard for	Limitless potential of comprehensive literacy that *includes* functional aspects, but also goes beyond them.
Promoting and pursuing linear research foci and strategies	while losing sight of	Important ecology of knowledges that guide knowledge creation and development.
Romantic view of the will-to-ignorance as something exciting and popular	instead of emphasising	The moral obligation to know as much as possible.
The simple and accessible as the primary focus of education	while forgetting	The simple is always what is simplified and linearity on its own can be disastrous with long-term consequences.
Language used as a mere tool or applied as a skill	and not	As an entity that speaks in and through the human thinker.

The research cannot be limited to national boundaries. For South Africa to compete internationally and globally it needs in-depth enquiry into information and knowledge and the matters underlying and influencing them, to be able to make any significant contributions. A long-term consequence would ideally be a balancing out of power relations. Instant solutions are therefore not ideal as it can enforce ignorance rather than alleviate it. For example, an instant solution would be functional literacy and long-term solutions would include information literacy that embraces lifelong education.

The impact regarding redress and equity will not be immediately noticeable, because issues such as redress and equity necessitate serious and patient research. Human beings have a different kind of relationship to their social and physical environments, which have become industrialised over a long period in human history. In such a commercialised societal environment, what is intellectually necessary may be seen as having limits, and the under-emphasis of the real, or discernible reality, is seen as a threat to some. Ideally, any research undertaken ought to have a much broader impact and meaning than just redress and equity, as the latter will change in

character and appearance as human societies continue to develop, grow and alter in their nature.

6.3 Conclusion

To counter the limitation of this study, which analysed text, it is recommended that a future, empirical study concentrate on interviewing philosophers and the philosophical scholars in information science. Philosophy and the philosophical in information science have the potential to generate theories that can inform information practice. Making a case for the presence of the philosophical in information science, including its interdisciplinary nature, also benefits the subject fields involved with the information phenomenon. The voyage across inner-, inter-, multi- and transdisciplinary boundaries requires dynamic, inclusive and always incomplete visions for information science as scholarly discipline and professional practice. Information science as a field can grow without philosophy, yet its oxygen is philosophical thinking. Without it, the path ahead may bring suffocation and stagnation, its true value denigrated to a cold, gasmask facade devoid of the spirit of humanity it is supposed to serve.

Does information science need philosophy or *the philosophical*? This may depend on how “need” is understood:

- essential, a necessity
  and/or
- required, a demand
  and/or
- deficiency, lack
  and/or
- must, should, ought to

What can philosophy and the philosophical do for us? Information science, instead, can become, and is, more than an information messenger by embracing and becoming the full character of Hermes (Image 12).

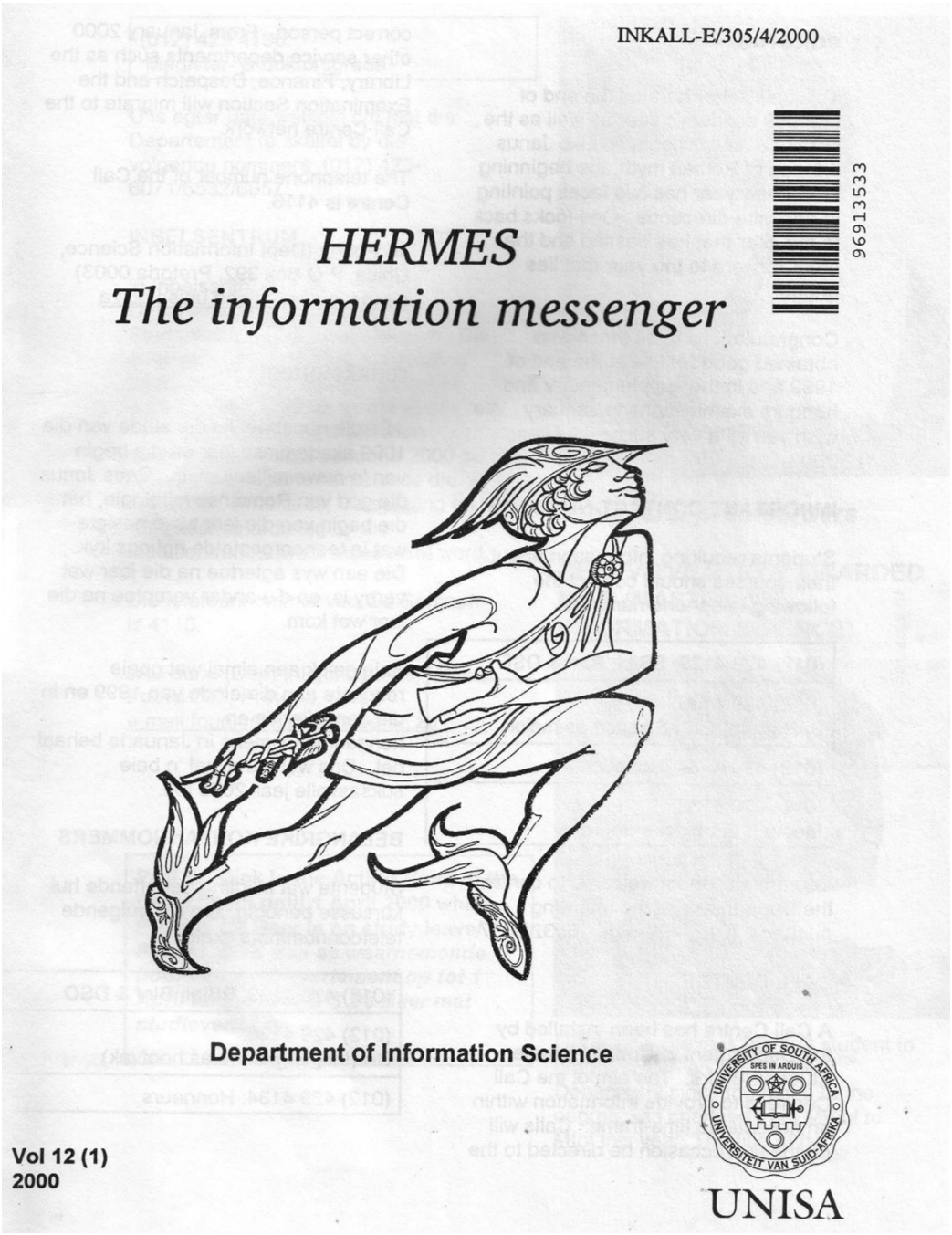


Image 12 Hermes: The information messenger. Cover design of the Unisa Department of Information Science Newsletter (2000)

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The Departmental requirement for referencing is the Harvard reference technique, based on the following book:

Burger, M. 2010. *Bibliographic style and reference techniques*. Pretoria: Unisa Press.

Important style notes:

- The bibliographic entries are arranged alphabetically, letter-by-letter.
- Brackets […] are used to indicate information, for instance date of publication, which had to be derived from sources *external* to the primary source, or any detail not from the source itself.
- URL: Date of access is included even for stable links.
- DOI: Date of access is omitted, because it is a permanent link.
- Kindle publications *without* pagination: Location numbers [loc] are cited in the text references.
- Online and electronic sources *without* pagination: Paragraph numbers [par] are cited in the text references.
- Privately owned unpublished material (not available for public access): Noted as 'Author's private collection' at the point of citation, but not listed in the bibliography.

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APPENDIX A: INFORMATION SCIENCE PUBLICATIONS WITH SPECIAL EDITIONS ON PHILOSOPHICAL AND EPISTEMOLOGICAL THEMES[24]

<table>
<tr><th colspan="2">Philosophies and philosophical concerns in Information Science</th></tr>
<tr><td colspan="2">Blair (2003) - Information retrieval and the philosophy of language; Blair (2006) - Wittgenstein, language, and information
Budd (2001) - Knowledge and knowing in library and information science: a philosophical framework
Capurro & Hjørland (2003) - The concept of information
Cornelius (2002) - Theorising information for information science
Day (2001) - The modern invention of information: discourse, history, and power; Day (2005) - Poststructuralism and information studies
Fallis (2006) - Social epistemology and information science
Frohmann (2004) - Deflating information: from science studies to documentation
Hjørland (1997) - Information seeking and subject representation: an activity-theoretical approach to information science; Hjørland & Nicolaison - The Epistemological Lifeboat (web based)
Svenonius (2000) - The intellectual foundation of information organisation
Wilson (1968) - Two kinds of power: an essay on bibliographic control
Robinson (2009) - communication chain and domain analysis</td></tr>
<tr><th colspan="2">Conceptions of library and information science (Vakkari & Cronin (eds) 1992)</th></tr>
<tr><td>Ingwersen – Conceptions of Information Science; Vakkari – Opening the horizon of expectations
<u>Origins, historical perspectives, the domain</u>:
Aarek, Järvelin, Kajberg, Klasson & Vakkari – History
Cronin – Hidden influencers, evolution
Frohmann – Knowledge and power, discourse analysis, cognitive viewpoint
Järvelin & Vakkari – Evolution, content-analysis
Rayward – Information in documents (history)
Saracevic – Origin, evolution, relations
<u>Philosophical approaches</u>:
Brier – Philosophy of science
Capurro – What is Information Science for, a philosophical reflection
Hoel – Hermeneutics</td><td><u>Theory and paradigm</u>:
Khawam – Theory building
Miksa – LIS: two paradigms
Savolainen – Sense-making theory
Wersig – IS and theory

<u>Mapping the terrain</u>:
Davenport – What do we look at when we do IS
Ellis – Paradigms and proto-paradigms in IR research
Hayes – Measurement of IS
Schrader – Systems theory of access
Smith – Interdisciplinary approaches</td></tr>
<tr><th colspan="2">Library Quarterly: Question of whether information science needs a philosophy</th></tr>
<tr><td><u>Theoretical, philosophical perspectives</u>:
Budd & Raber 1998 – The cultural state of the Fin De Millénaire Library
Budd 1995 – Epistemological positions and LIS
Dick 1995 – LIS as a social science: neutral and normative conceptions; Dick 1999 – Epistemological positions in LIS
Radford & Budd 1997 – We do need a</td><td><u>Knowledge organisation, information representation</u>:
Bradley & Sutton 1993 – Reframing the paradigm debate
Garfield 1980 – Information retrieval in Arts and Humanities
Green 1995 – Syntagmatic relationships in index languages
Knapp et al 1998 – Natural language</td></tr>
</table>

[24] The compilation in this table was done by the Author.

philosophy of LIS: we're not confused enough Sandstrom & Sandstrom 1995 – Use and misuse of anthropological methods in LIS research; Sandstrom & Sandstrom 1998 – Science and nonscience in qualitative research Sutton 1993 – Rationale for qualitative research: principles and theoretical foundations Thomas & Nyce 1998 – Qualitative research in LIS redux – a response to a [re]turn to positivistic ethnography Wildemuth 1993 – Post-positivist research: two examples of methodological pluralism Zwadlo 1997 – We don't need a philosophy of LIS: we're confused enough	thesaurus for the Humanities Swanson 1980 – Libraries and the growth of knowledge
***Journal of the American Society for Information Science* 1999, 50(12), Part 2: Paradigms, models, and methods of information science: The nature of the field and its underlying paradigms, models, and methods**	
Theoretical, philosophical perspectives: Bates - The invisible substrate of information science Crowley - The control and direction of professional education Flood - Historical note: the start of the stop list at biological abstracts Ford - The growth of understanding in information science - towards a developmental model Haythornthwaite, Bowker, Jenkins & Rayward - Mapping the dimensions of a dynamic field Palmer - Aligning studies of information seeking and use with domain analysis Saracevic - Information science Spasser - Informing information science - the case for activity theory Summers, Oppenheim, Meadows, McKnight & Kinnell - Information science in 2010: a Loughborough University view. Van der Veer Martins - Biographical note: Robert S Taylor Warner - An information view of history White - Scientist-Poets wanted Windsor - Industrial roots of information science	Knowledge organisation, information representation: Chalmers - Comparing information access approaches Chalmers - Comparing information access approaches Dresang - More research needed - information seeking behaviour of youth on the Internet Ellis, Allen & Wilson - Information science and information systems: conjunct subjects disjunct disciplines Kling & Crawford - From retrieval to communication: the development, use, and consequences of digital documentary systems Marty - Museum informatics and collaborative technologies Savage-Knepshield & Belkin - interaction in information retrieval: trends over time Soergel - The rise of ontologies, or the reinvention of classification
***Social Epistemology* 2002, 16(1): Social epistemology and information science**	
Budd - Jesse Shera, social epistemology and praxis Dick - Social epistemology, information science and ideology Fallis - Introduction – Social epistemology and information science Floridi - On defining LIS as applied philosophy of information Furner; Hongladarom; McDowell; Smith; Van House	

<table>
<tr><th colspan="2">Library Trends 2004, 52(3): The philosophy of information</th></tr>
<tr><td>Theoretical, philosophical perspectives:
Budd - Relevance: language, semantics, philosophy
Cornelius - Information and its philosophy
Day - Community as event
Fallis - On verifying accuracy of information: philosophical perspectives
Frohmann - Documentation redux (phenomenology)
Furner - Information studies without information
Hjørland - Arguments for philosophical realism in LIS</td><td>Knowledge organisation, information representation:
Brier - Cybersemiotics and information processing paradigms for unified science of information behind LIS
Floridi - LIS as applied philosophy of information
Jacobs - Classification and categorisation
Mills: Faceted classification and logical division in IR [Otlet – Rayward]
Olson - Ubiquitous hierarchy
Paling - Classification, rhetoric and classificatory horizon
Spink & Cole - Human information behaviour approach to PI
Svenonius - Epistemological foundations of knowledge representations
Thellefsen - Knowledge profiling – basis for knowledge organisation</td></tr>
<tr><th colspan="2">Journal of Documentation 2005, 61(1): Library and information science and philosophy of science</th></tr>
<tr><td colspan="2">Budd - Phenomenology and information studies
Hansson - Hermeneutics as a bridge between modern and postmodern in LIS
Hjørland - Comments on the articles and proposals for further work; Empiricism, rationalism and positivism in LIS; LIS and the philosophy of science
Radford & Radford: Structuralism, post-structuralism and the library - de Saussure and Foucault
Seldén - On grounded theory
Sundin & Johannisson - Pragmatism, neo-pragmatism and sociocultural theory: communicative participation as a perspective in LIS
Talja, Tuominen & Savolainen: “Isms” in information science - constructivism, collectivism and constructionism
Wikgren - Critical realism as philosophy and social theory in IS</td></tr>
<tr><th colspan="2">Information Research 2013, 18(3): CoLIS 8: Conference - philosophies, social and cultural perspectives and new perspectives on LIS subfields</th></tr>
<tr><td>Theoretical, philosophical perspectives:
Bawden & Robinson - “Deep down things”: in what ways is information physical, and why does it matter for information science?
Cibangu - Toward a critique of the information age: Herbert Marcuse’s contribution to information science's conceptions; Hartel - Castles and inverted castles: the work of Marcia J Bates
Ma - Is information still relevant?
Vamanu - Hermeneutics: a sketch of a metatheoretical framework for LIS research
Wang - Cultural-historical activity theory and domain analysis: metatheoretical implications for information science
Zhang & Jacob - Understanding boundaries: physical, epistemological, virtual dimensions</td><td>Knowledge organisation, information representation:
Audunson & Aabø - From collections to connections: building a revised platform for library and information science
Feinberg, Bullard & Carter - Using design experiments to investigate conceptual issues in knowledge organization
Frické - Facets: ersatz, resource and tag
Sköld - Tracing traces: a document-centred approach to the preservation of virtual world communities
Tennis - Metaphors of time and installed knowledge organization systems: Ouroboros, Architectonics, or Lachesis? Whaite - New ways of exploring the catalogue: incorporate text, culture</td></tr>
</table>

APPENDIX B: HJØRLAND'S LIST OF LIS LITERATURE ABOUT THEORIES, METATHEORIES AND PARADIGMS

Summary of Hjørland's (2019b) identification of writings about theories, metatheories and paradigms in Library and Information Science
Åström (2006:20): "fields with strong connections to professional practices, disciplines do not necessarily develop out of research areas or scholarly interest groups, but out of professions or schools for professional practices. LIS is one example, but there are others as well. One is management research, described by Whitley (1984) as a 'fragmented adhocracy', a field with a low level of coordination around a diffuse set of goals and a non-specialized terminology; but with strong connections to the practice in the business sector".
List of approaches identified by Bates (2005): • A historical approach • A constructivist approach • A constructionist or discourse-analytic approach • A philosophical-analytical approach • A critical theory approach • An ethnographic approach • A socio-cognitive approach • A cognitive approach • A bibliometric approach • A physical approach • An engineering approach • A user-centred design approach • An evolutionary approach
Egan and Shera (1952) introduced the term social epistemology (SE) which today has become important in, for example, philosophy and sociology. This view, neglected for a long time in LIS, seems to be undergoing a renaissance. An updated version of social epistemology may be the most important theoretical contribution to LIS.
Ellis (1992 and in other papers) analysed the physical paradigm and the cognitive paradigm in information retrieval.
Frohmann's work is influenced by the philosopher Ludwig Wittgenstein; it contains important implications for LIS, including indexing theory and the understanding of the concept of information.
Fuchs (2011:81) is a book written from a Marxist perspective: 'If the turn from information theory towards cognitivism is characterized as the first turn in formation science and the turn from cognitivism towards society as the second turn in information science, then we can argue what is now needed is a third turn in information science from considering information in society towards considering the power structures of information in society.'
Leckie *et al* (2010) present 26 critical theorists in 23 chapters and illuminate their importance for LIS.
Olaisen (2003) is critical about the dominant paradigm in library science (functionalism, logical empiricism) and suggests more focus on criticism and constructivism. He found that "The broadening of library research, or the wish to broaden it, can be seen in the works of Buckland (1982), Wilson (1983), Swanson (1979) and others."
Ørom (2000) discussed the following paradigms: • a pre-war paradigm viewing the library as a social institution • the physical paradigm • the cognitive view • alternative perspectives representing a new tendency towards an integration of the social dimension of the discipline

Pickard's (2013) textbook on research methods in information studies and presents three major research paradigms, namely positivist research, postpositivism and interpretivism.
Talja *et al* (2005) describe the basic premises of three metatheories that represent important or emerging perspectives on information seeking, retrieval and knowledge formation in Information Science: (1) constructivism, (2) collectivism and (3) constructionism.
Tredinnick (2006) introduces the physical paradigm and the cognitive shift in Information Science, including chapters on digital information and computer science, language and representation, and semiotics, post-structuralism, post-modernism, complexity.
Wersig (2003) provides the following outline: • 1948-1970s: The Shannon and Weaver phase • 1970-: The cognitive view • 1980s-: New theoretical directions, including constructivism, systems theory, action theory, modernisation theory, of which the common core is complexity.
Wilson (1983) argues that social epistemology is important for LIS. He connects this view to skepticism (Pyrrhonian skepticism) as 'a highly appropriate attitude toward the productions of the knowledge industry' and that the Skeptic, world watcher and librarian all take the same attitude toward the 'world of ideas' (1983).

APPENDIX C: CRONIN AND MEHO'S LIST OF INFORMATION SCIENTISTS WRITING ABOUT FRENCH THEORISTS

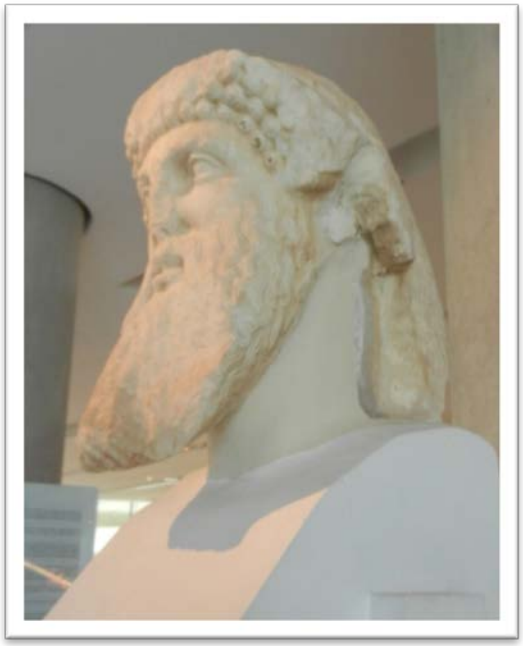
Cronin and Meho's (2009) list of information scientists writing about French theorists	
Andersen and Skouvig	They use the theories of **Michel Foucault** and **Jürgen Habermas** to provide a *sociohistorical analysis* and critique of knowledge organisation to point out how the discipline understands itself and how it is a *de facto* human activity. They investigate the self-understanding of the discipline through the case of knowledge organisation in Danish public libraries at the beginning of the twentieth century, using the theories of Foucault.
Black	Just as **Foucault** employed the 'birth of the clinic' as a metaphor for the emergence of modern medicine and its expert discourse in the setting of the scientific hospital around the turn of the nineteenth century, so the notion of 'library as clinic' can be seen to encapsulate later *discourses of control* associated with public librarianship.
Bouthillier	An *ethnographic study* designed to understand the nature and the role of public library service in a specific context. Using the theoretical frameworks of **Pierre Bourdieu** and **Anthony Giddens**, Bouthillier provides an analysis of the basic systems of meaning that service providers bring to their interaction with users.
Budd	Examines work on *phenomenology* to determine what information studies can learn and use from that work. The paper presents a literature-based conceptual analysis of pioneering work in phenomenology (including that of **Edmund Husserl, Martin Heidegger, Paul Ricoeur**, and others), application of such ideas as intentionality and being in information studies work, and the potential for greater application of the information seeker as other.
Burnett	Communities, whether real or virtual, are mediated by interpretation. One's place within a community is constituted by an ongoing metaphoric 'reading' through which one attempt to understand what others within the community say and do. Virtual communities are unique in making such reading explicit through further acts of writing: participants form their communities through public performances of writing, reading and interpreting of texts. Analysis of virtual communities must take into account both the exchange of meaning through texts and the fact of a mediating distance between participants. The *hermeneutic theories* of **Ricoeur** can support an analysis of these activities, which accounts for temporal and spatial distance in the exchange of the community's texts. Ricoeur's hermeneutic theory can be used to describe the process that drives virtual communities, which makes them into forums that attempt to 'connect the scattered members of an invisible republic' in an electronic world.
Dilevko	Using the theories of **Bourdieu** about occupational fields of struggle and species of capital, Dilevko examines the ideological implications of the digital reference call-centre model.
Frohmann	The kind of *discourse analysis* practiced by **Foucault** and his followers is a useful research method in library and information science. The method permits analysis of the ways in which information, its uses, and its users are discursively constructed, especially in the theoretical discourses of LIS, such that power over them can be exercised in specific ways.

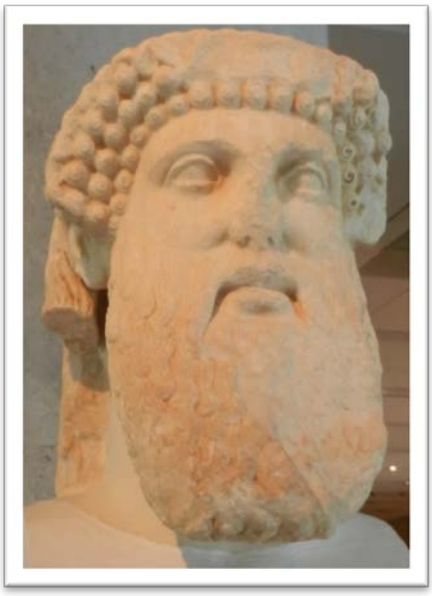
Haikola and Jonsson	Explore future role of the library pertaining to state surveillance. They present the procedure and theoretical background for the article, grounded on **Foucault**'s theory on *discourse*, power and the modern state.
Hannabuss	**Jean-Francois Lyotard**'s work on *postmodern knowledge* has been influential on our thinking of paradigms, meta-narratives, legitimation and contemporary trends in the information economy. These issues are discussed, criticisms of his work examined, and implications for information professionals explored.
Herring	The results of this study are analysed in terms of the writings of **Patrick Wilson, Bruno Latour, Fritz Ringer** and **Thomas Pinelli**, focusing on *cognitive authority* within a profession, interaction between disciplines, and information-gathering habits of professionals.
Jablonski	Arguments from **Latour**'s Pandora's Hope are used with historical context to explain the coevolution of librarianship and information science in the 20th century. Latour's *circulating chains of reference model* illustrates how real-world phenomena are gradually abstracted into scientific ideas and artefacts. The information thus produced becomes the chief actant in library and information science. These chains have five main components: links and knots, public representation, alliances, autonomisation, mobilisation of the world.
Luukkonen	Discusses the lamented lack of a theory of citations and the lack of a *sociological theory* in particular. The article draws attention to one proposed theory and discusses the potential reasons why it has not been generally accepted as the theory of citations, despite its merits in explaining many phenomena in the citation behaviour of scientists. This theory has been expounded by **Latour** and presented in his book entitled *Science in Action*.
Manoff	Creative and compelling theoretical formulations of the archive have emerged from a host of disciplines in the last decade. **Jacques Derrida** and **Foucault**, as well as many other humanists and social scientists, have initiated a broadly interdisciplinary conversation about the nature of the archive. This literature suggests a confluence of interests among scholars, archivists and librarians that is fuelled by a shared preoccupation with the function and fate of the historical and scholarly record. Exploration and overview of this *archival discourse*.
McNabb	The author applies **Foucault**'s *theories of discourse* to the industry of journal publishing.
Radford	Introduces **Foucault**'s *Archaeology of Knowledge* as a way of addressing what Wayne Weigand has termed 'tunnel vision and blind spots' in the discipline of Library and Information Science (LIS). Invoking Foucault's Archaeology in the context of Wiegand's problem provides a framework in which to understand: (1) how the discursive formation of LIS is itself a problem to be analysed beside others; (2) how the nature of the discursive formation hinders potentially fruitful research in LIS; (3) how understanding Wiegand in terms of Foucault can help to generate a new *self-reflexive and critical attitude* among LIS scholars to their own *discursive formation* and the discursive formations of others.
Radford and Radford	Approach the librarian stereotype as an element in a wider cultural test: that of the relationship between power, knowledge and fear. Drawing on the work of **Foucault** and *feminist thought*, the claim is developed that the form and the voice of the female librarian is a

	function of a system of power and rationality that is not of her own making.
Rasmussen and Jochumsen	By means of contributions from recent significant, *sociologists*, such as **Giddens, Lyotard** and **Scott Lash**, they discuss the implications of the development of late modern or *postmodern society* for the present public library.
Sterne	Drawing on the writings of **Foucault** and **Bourdieu**, as well as several Anglo-American cultural studies of disciplinarity, Sterne argues that digital media studies has not yet constituted a truly novel scholarly *discourse*.
Van House and Sutton	They use *ecological theory* (biological, organisational and professional) and the *sociological theory* of **Bourdieu** to describe the radical nature of the change facing LIS education and to identify adaptive strategies. They warn that survival of LIS education does not necessarily mean the survival of current programs, and certainly not in their current forms. They caution that the increasing value of information is bringing other professions into the information field and changing the boundaries and rules of competition.
Weller and Haider	Aspects of **Bourdieu**'s study of the university as a hierarchically structured field of forces are considered. The paper advances the view that the role of academic LIS research, debate and *theory formation* needs to be strengthened and that this needs to be reflected in the curriculum more strongly. The paper attempts to highlight consistently overlooked contributing factors, and thus aims to shift the perspective towards role and position of LIS research within academia, rather than vis-à-vis to which the professional education it is connected.

APPENDIX D: IMAGES OF HERMES

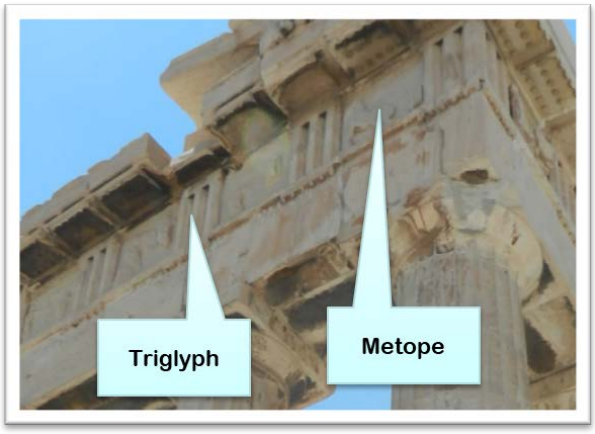
Hermes from a hermaic stele: 1st century BC copy of Hermes Propylaios (430 BC). New Acropolis Museum, Athens (hermaic steles typically marked entrances of public and private spaces).





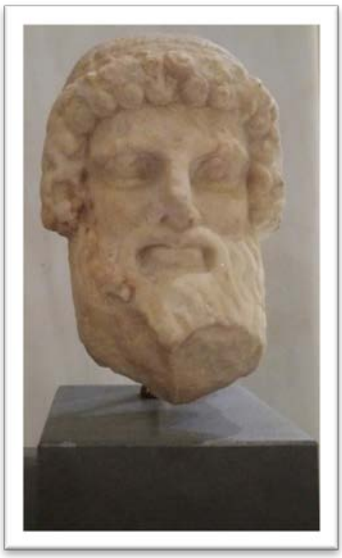
Hermes defeats a giant: This is metope 1 from the east side of the temple depicting a scene from the Gigantomachy, 447-438 BC. New Acropolis Museum, Athens (Acr. 20.000).

The metopes of the Parthenon (interior photos taken in the New Acropolis Museum; exterior photo taken at the Acropolis): Metopes are the square spaces for decorations on the entablature of a Doric frieze, separating each triglyph (447-432 BC).



Photos by Karin McGuirk (taken 04 August 2018 in Athens, Greece)

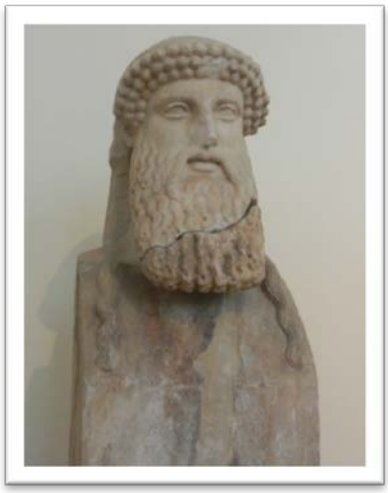
Marble head of Hermes from a herm: 480-460 BC. Herms were often crowned by heads of Hermes and typically set up at cross roads or house entrances. Benaki Museum, Athens.

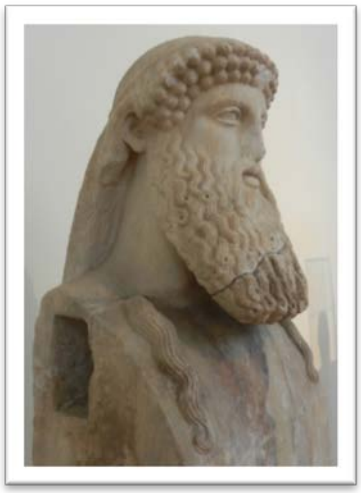


Marble double herm: AD 75-100. It is the only known copy that represents on both faces the Hermes Propylaios type. Benaki Museum, Athens.

Photos by Karin McGuirk (taken 05 August 2018 in Athens, Greece)

Herm. Upper part of the stele with the head of Hermes: 1st c. BC – 1st c. AD copy of late 5th c. BC original. National Archaeology Museum, Athens.



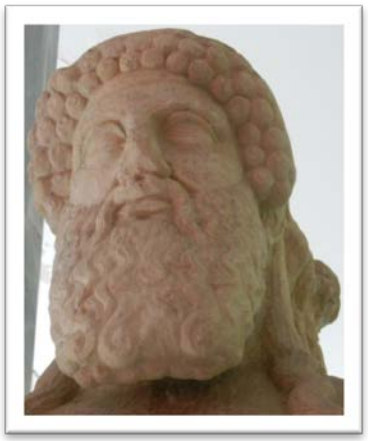


Photos by Karin McGuirk (taken 15 August 2013 in Athens, Greece)

Statue of Hermes: 2nd c. AD copy of a late 5th c. BC. Hermes is shown with a chlamys, a petassos on his head, and grasping the horns of a ram. National Archaeology Museum, Athens.

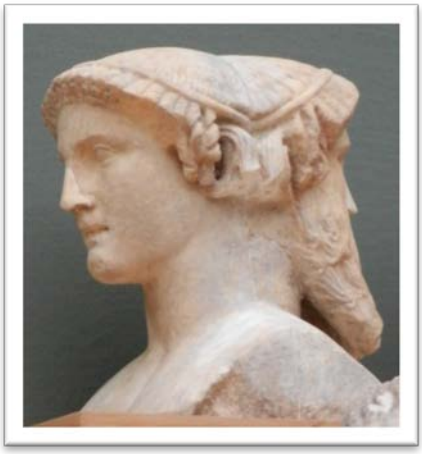
Photos by Karin McGuirk (taken 15 August 2013 in Athens, Greece)

Double herm with Hermes and Apollo: 2nd c. AD copy. The herm ends in two heads, back to back. The one represents a bearded Hermes, in the archaistic type of Hermes Propylaios. The other head depicts Apollo. National Archaeology Museum, Athens.


Photos by Karin McGuirk (taken 15 August 2013 in Athens, Greece)

Double herm with Hermes and Apollo. Glyptoteket Museum, Copenhagen.

Photos by Karin McGuirk (taken 20 August 2017 in Copenhagen, Denmark)

IP: All photos taken by Karin McGuirk

APPENDIX E: THE RHIZOME

The physical rhizome

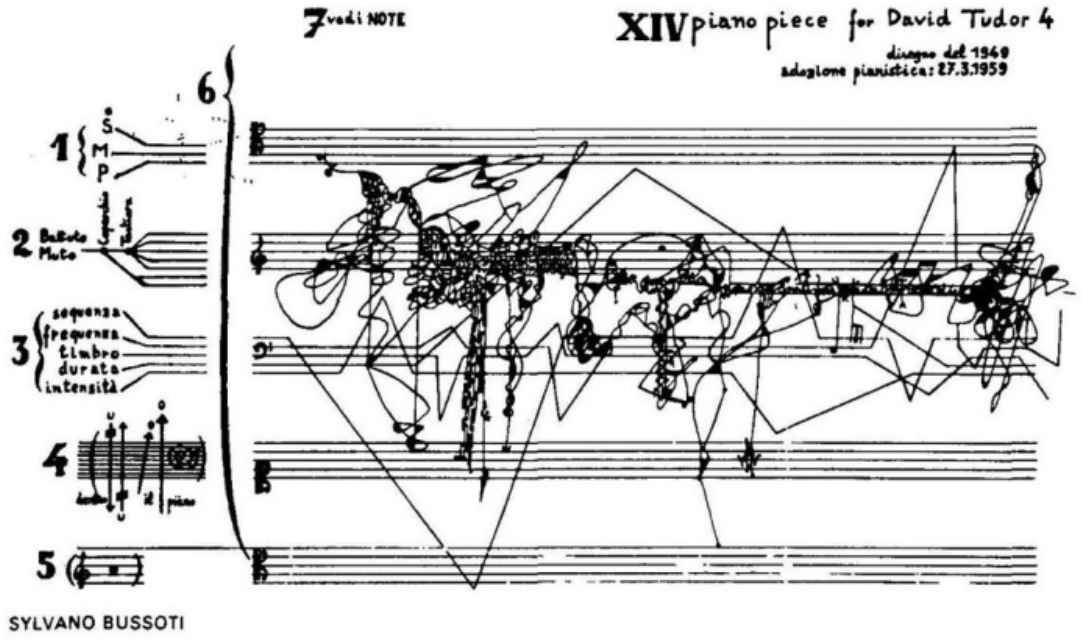
- Underground stems that grow horizontally, for example bamboo, canna, grass, ground ivy, bearded iris and waterlily grow by rhizomes (Iannotti 2019).
- A ‘prostrate stem below the ground that sends off rootlets and vertical stems or leaves; in the *Poaceae*, lateral underground stems that collectively constitute a “sod” from which leafy stems emerge’ (*Glossary for vascular plants* 2019, sv ‘rhizome’).
- A ‘segmented, subterranean, modified stem arising from an adventitious bud in the crown zone’ (*Rhizomes and stolons* 2019).
- An underground root system of bamboo grows horizontally in the soil just underneath the surface. Rhizomes produce roots and shoots at the nodes, with the feeder roots growing further down. Bamboo rhizomes have two unique growth patterns, namely either in a clumping formation or in a running habit:
    - Clumping bamboos have *Pachymorph* rhizomes, which grow upwards developing into a new culm (stem) with new rhizomes emerging from buds on an existing rhizome. The accumulative effect leads to a grove expanding slowly around the perimeter, which will eventually reach a boundary, for example a fence.
    - Running bamboos have *Leptomorph* rhizomes that run horizontally under the ground. New buds and roots emerge from the nodes of the rhizomes, with the new rhizomes also running horizontally underground and producing more culms and rhizomes (*Bamboo anatomy and growth habits* 2019).
- Rhizomes of grasses and may be determinate or indeterminate:
    - Determinate rhizomes are short and turn upward to form a new aerial shoot. The rhizome growth has three phases: downward, lateral and upward. Determinate rhizomes tend to form in patches, pushing into the soil, rather than producing dense mats.
    - An indeterminate rhizome spreads out at a greater distance, branching at the nodes (*Rhizomes and stolons* 2019).

Rhizomatic knowledge: Quotes from Deleuze and Guattari (1987)

- ‘Principles of connection and heterogeneity; any point of a rhizome can be connected to any other, and must be.’ ‘A rhizome ceaselessly establishes connections between semiotic chains, organizations of power, and circumstances relative to the arts, social sciences, and social struggles’ (Deleuze & Guattari 1987:7).
- ‘There are no points or positions in a rhizome, such as those found in a structure, tree, or root. There are only lines’ (Deleuze & Guattari 1987:9).
- A ‘rhizome may be broken, shattered at a given spot, but it will start up again on one of its old lines, or on new lines’ (Deleuze & Guattari 1987:9).
- ‘The wisdom of the plants: even when they have roots, there is always an outside where they form a rhizome with something else - with the wind, an animal, human beings… Follow the plants: you start by delimiting a first line consisting of circles of

convergence around successive singularities; then you see whether inside that line new circles of convergence establish themselves, with new points located outside the limits and in other directions' (Deleuze & Guattari 1987:11).

- "[T]here exists tree or root structures in rhizomes; conversely, a tree branch or root division may begin to burgeon into a rhizome" (Deleuze & Guattari 1987:15).
- 'The rhizome is an acentered, nonhierarchical, nonsignifying system without a General and without an organizing memory or central automation, defined solely by a circulation of states" (Deleuze & Guattari 1987:23).
- '[W]e call a "plateau" any multiplicity connected to other multiplicities by superficial underground stems in such a way as to form or extend a rhizome' (Deleuze & Guattari 1987:24).
- A 'rhizome has no beginning or end; it is always in the middle, between things, intermezzo' (Deleuze & Guattari 1987:25).



Sylvano Bussoti 1980: *XIV-piano-piece-for-David-Tudor-4* (image from Deleuze & Guattari 1987:3).

APPENDIX F: ETHICS APPROVAL (REF #2019-DIS-0049)

UNISA university of south africa

DEPARTMENT OF INFORMATION SCIENCE ETHICS REVIEW COMMITTEE

05 December 2019

Dear Ms Karin McGuirk

DIS Registration #: Rec-051219

References #: 2019-DIS-0049

Name: K McGuirk

Student #: [redacted]

Decision:

Ethics Approval from 5 December 2019 to 5 December 2024

Researcher(s): Ms Karin McGuirk
31765785@mylife.unisa.ac.za
082 8477 067

Supervisor(s): Prof MS Ngeoep
ngoepms@unisa.ac.za
012 429 6071

The role of philosophy and the philosophical in information science.

Qualifications: Doctoral Study

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
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Thank you for the application for research ethics clearance by the Unisa Department of Information Science Research Ethics Committee for the above-mentioned research. Ethics approval is granted for five years.

The ***low risk application*** was reviewed and expedited by the Department of Information Science Research Ethics Committee on 5 December 2019 in compliance with the Unisa Policy on Research Ethics and the Standards Operating Procedure on Research Ethics Risk Assessment. The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy of Research Ethics.
2. Any adverse circumstances arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the Department of Information Science Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards the protection of participants' privacy and the confidentiality of the data should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no. 4 of 2013; Children's Act no. 38 of 2005 and the National Health Act, no. 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
7. No field work activities may continue after the expiry date of **5 December 2024**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

*The reference number **2019-DIS-0049** should be clearly indicated on all forms of communication with the intended research participants, as well as the Committee.*

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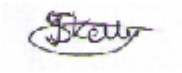
Yours sincerely



Dr Isabel Schellnack-Kelly
Department of Information Science: Ethics Committee

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